Haines Borough Administration
Mark Earnest, Borough Manager
(907)766-2231 ● Fax(907)766-2716
mearnest@haines.ak.us

January 10, 2012

Water Plant Roof Update

On December 21, 2011, John Koch of HDR Engineering, Inc. visited Haines at the request of the Borough to inspect the Wastewater and Water Treatment Plants. Mr. Koch is an engineer currently working on a utility project in Skagway. During the tour of the Water Treatment Plant, he stated that the roof of the structure was in imminent danger of failure and that immediate action was needed to make the necessary repairs to the structure. Due to concerns for worker safety and potential disruption of municipal water treatment and distribution and fire protection, I as Borough Manger deemed it necessary and in the public interest to immediately enter into a sole source contract pursuant to Section 3.60.180 of the Haines Borough Code as an emergency procurement.

> 3.60.180 Emergency contracts.
>
> Whenever, because of any emergency, it is deemed necessary and in the public interest by the manager to enter into any contract without following the applicable competitive bidding procedures required by this title, the manager shall authorize such emergency contract if the estimated sum involved does not exceed $50,000. If the estimated contract sum involved is greater than $50,000, the manager shall refer any proposed emergency contract to the assembly for its approval and authorization to waive the competitive bid procedures. (Ord. 07-08-163)

At the recommendation of Brian Lemcke, Public Facilities Director, I entered into a contract with Stickler Construction for labor and equipment to perform the repairs, in an amount not-to-exceed $50,000 on December 22, 2011, a copy of which is attached. The Borough purchased separately the materials, which consisted of framing, roofing, insulation, and related items. It should be noted that the main steel frame appears to be in relatively good condition, but the steel will be inspected when the existing roofing materials are removed.

Funding for the repairs is included in the proposed FY12 Budget Amendment scheduled for introduction at the January 10, 2012 Assembly meeting.

Solid Waste

Recent events regarding acceptance, processing, and treatment of solid waste in Haines has become a significant concern requiring a significant amount of attention over the past month. We are pursuing several courses of action to address immediate and long-term concerns.

The most compelling short-term issue for the Borough is the disposal of sludge and screenings from the Borough’s Wastewater Treatment Plant. Community Waste Solutions is no longer able to accept these products at their landfill facility. Borough staff has come up with a plan and implemented a system for treating sludge. We will need to have the plan approved by the Alaska Department of Environmental Conservation, but Scott Bradford has been working with the department on this effort. Regarding the screenings, we have requested assistance from HDR Engineers to develop a plan for treating this product. The good news at least in the short term is that the volumes of both sludge and screenings are relatively small, and there are existing technologies and systems that can be incorporated into our existing facility.

To address the bigger-picture questions, I have requested from Jeff Brown of Epicenter Services, LLC a scope of work and fee proposal for a Haines Borough Waste Management System technical report. Mr. Brown is a consultant and colleague with Jeff Morris of Zerowaste who was very involved in the May 2000 Haines Borough Solid Waste Management Plan. The purpose of the current effort is to (1) work with the Borough to identify options and develop a shortlist of waste management system alternatives and (2) produce initial analysis of options with pros/cons of the various approaches, with order of magnitude of costs, as needed for the Borough to make decisions on how to proceed. I have authorized Mr. Brown to travel to Haines to begin this work. He is scheduled to arrive in Haines late in the afternoon on Wednesday, January 11 and depart early Saturday, January 14. This is a fairly complex undertaking, and consulting services are required in order for the Borough to navigate through the technical, regulatory, financial, and legal issues.

I have attached some background materials on these efforts to this report.

Budget Impacts from CWS Rate Increase

Included in the Assembly packet is information from Jila Stuart, CFO, regarding impacts to the Borough FY12 Budget as a result of the recent rate increase Community Waste Solutions for solid waste services.

Crystal Cathedrals Water System Update

Carson Dorn has delivered a draft technical memorandum titled: Crystal Cathedral Water System Pressure Evaluation." The draft memorandum presents three options and associated capital cost estimates for connecting Crystal Cathedral water system to the Borough's water system. One of the most important considerations in this effort is achieving water pressures that are in an acceptable range. The options include booster pumps for individual residences at the higher elevations, a water booster pump station with standby generators, and water booster pump and water tank. There are approximately 20 lots within Cathedral View Drive and Hooter lane that cannot be adequately served by the current Borough water system due to elevation / water pressure constraints.

Community Center RFQ Selection Committee

The following is my recommendation for the Community Center RFQ Selection Committee composition.

1. Parks & Recreation Advisory Committee representative
2. Chilkoot Indian Association representative
3. Planning Commission member
4. Borough Assembly member
5. Borough Assembly member
6. Downtown Revitalization Committee representative
7. School District representative

Haines Borough Facilities

In an effort to accelerate the Borough Facility Master Plan project, which is currently identified as the Borough's #2 State Legislative priority project for 2012, I would offer the following option for Assembly's consideration: Fund the effort through existing Borough General Fund balance, and pursue design and construction funding for facility deferred maintenance through the Legislature.

The Master Plan effort is being proposed at a cost of $150,000. If Assembly concurs with this direction, the current FY 12 Budget Amendment could be amended to fund this effort internally. It would also demonstrate to the State that the Borough is serious about this need and is willing to contribute Borough funds.

Additionally, the same approach can be taken for the Chilkat Center roof repairs. The Assembly approved a motion allocating up to $50,000 to begin efforts to address the roof deficiencies at that facility at the December 13 meeting. I would recommend that this effort also be included as a budget amendment to the CIP Fund. Although there are sufficient funds to accomplish this task, placing the Chilkat Center repairs above other Borough priorities means other important deferred maintenance projects will be delayed until funding for them is approved at a later date.

It is important to note that the CIP Fund is used regularly to develop preliminary design / cost estimates for grant submittals. This approach has proven to be very successful in achieving higher evaluation scores by grant agency reviews.

Suggestion for consideration: Add to the Budget Amendment (CIP Fund - General Fund Reserve):

- Chilkat Center Roof Repairs - $50.0
- Borough Facility Master Plan - $150.0

Picture Point Development Grant Application

The grant application to for Picture Point – Phase II development has been submitted to the Alaska Department of Transportation and Public Facilities. As previously reported, the grant funding source is the U.S. Department of Transportation, National Scenic Byways program. The proposed scope of work includes design and construction of visitor amenities and other improvements as envisioned by the land acquisition application last year.

Picture Point Park Ordinance

I met with Rob Goldberg, Chair of the Planning Commission, to make revisions to the Picture Point Park Ordinance. As previously reported, the Borough is obligated to establish a mechanism for protecting "in perpetuity" the compensatory mitigation measures at Picture Point for the Port Chilkoot Dock Waterfront Improvements project. The proposed ordinance establishing Picture Point Park satisfies the terms of the permit imposed by the U.S. Army Corps of Engineers. PND Engineers has outlined the special conditions, including restoration and enhancement of intertidal shoreline at Picture Point to establish tide pools and create a park. The revised ordinance will be taken up by the planning Commission at their next meeting.

Haines Port Development Request for Qualifications

The Borough has received four separate Qualification Statements from firms in response to the Borough's Request for Qualifications to assist in the Haines Port Development project. The Haines Port Steering Committee (HPSC) will be tasked with reviewing the submittals and make a recommendation for Assembly's consideration.

RFP / RFQ Update

We are currently working on the following Request for Proposals and Request for Qualifications:

- Lutak Port Development RFQ (Qualification Statements received – pending review by HPSC)
- Community Center RFQ (Qualification Statements received – pending review by SC)
- Chilkat Center Roof RFQ (alternate plan – scope and cost estimate provided by JYL)
- Borough Land Sales RFP (on hold pending Comp Plan)
- Junk and Impound Vehicle RFP (in progress)
- Excursion Inlet Hydro Reconnaissance Study RFP (currently being developed)

Personnel:

I overlooked a recent hire for a very important Borough position. Please take a moment in welcoming Jennifer F. Walsh as our new Firefighter/EMT. She is a wonderful addition to our public safety crew. She has amazing talents, is hard working, and a great perspective.

HAINES BOROUGH
Construction Services Contract
and NOTICE TO PROCEED

Emergency Roof Repair Project
Water Treatment Plant

The Haines Borough ("the Borough") hereby issues a Notice to Proceed to Stickler Construction, Inc., ("the Contractor") effective December 22, 2011. Pursuant to HBC 3.60.180 Emergency contracts, the borough manager has deemed it necessary and in the public interest to enter into this contract without following competitive bidding procedures.

After examination, several engineers have determined the roof of the Haines Water Treatment Plant is in imminent danger of collapse and requires immediate emergency repair. In order to safeguard the Borough's employees, equipment and ability to supply safe water to the community, the borough manager has authorized this emergency contract with the Contractor. The total funds payable to the Contractor under this contract are estimated not to exceed $50,000.

The Borough enters into this agreement with the Contractor to provide labor and equipment rental for the following repairs:

1. Remove and dispose of the existing roofing, insulation and framing;
2. Attach new pressure-treated 4"x10" purlins to existing structural steel framing members;
3. Install ¾" OSB, 15lb felt and new 24-gauge steel roofing including all trims and closures, as required, (Tahoe Blue in color) over the entire roof system;
4. Install 6" fiberglass insulation, 6 mill CVB and ½ inch OSB to ceiling;
5. Protect the interior of the building and the equipment within from the elements and falling debris during construction;
6. Provide clean-up at the end of the job; and
7. Communicate with the Haines Public Facility Director prior to any changes in materials or methods.

The Contractor will provide the Borough with proof of all required licensing and insurances.

The Contractor will invoice the Borough for all labor and equipment rental as noted in the attached cost schedule. This project is subject to AS 36.5, Minimum Wage Rates, and certified payroll reporting.

The Borough will provide all necessary materials, related disposal fees, and sanding of the work area, as needed.

The Contractor recognizes the emergent nature of this project and will begin the work as soon as possible.

HAINES BOROUGH

Julie Cozzi for
Mark Earnest, Borough Manager

12-22-2011
Date

HAINES BOROUGH INCORPORATED SEAL OCTOBER 17 2002 STATE OF ALASKA

STICKLER CONSTRUCTION INC.

David Stickler, Principal

12-22-11
Date

Stickler Construction Company
P.O. Box 974
Haines, Alaska 99827
Ph:(907) 766-2949 Fax: (907) 766-2974
email: sticklerconstructionco@yahoo.com

ESTIMATE

DATE	ESTIMATE #
12/22/2011	349

NAME / ADDRESS
Haines Borough P.O. Box 1209 Haines, Ak. 99827

PROJECT

DESCRIPTION	QTY	COST	TOTAL
Hourly rate for roof repairs on water treatment plant (estimated +or- 2.5-weeks x 3-men)	1	77.50	77.50
Equipment Rental as Described: daily rate for forklift (estimated 5-6 days)	1	300.00	300.00
Equipment Rental as Described:Daily rate for dump truck+hauling (estimated 3-4 days)	1	200.00	200.00
Equipment Rental as Described: Daily rate/ hand power (approximate 15 days)	1	25.00	25.00
Equipment Rental as Described: Daily Air compressor & hoses (approximate. 7-10 days)	1	35.00	35.00
Framing Materials as Described: No estimate (owner provided)		0.00	0.00
Roofing Materials as Described: no estimate (owner provided)		0.00	0.00
Insulation Materials as Described: No estimate (owner provide)		0.00	0.00
Job Materials: No estimate (owner provided) Ceiling plywood & paint		0.00	0.00
		TOTAL	$637.50

E-mail
sticklerconstructionco@yahoo.com

SIGNATURE ______________________

Attachment 2

Water and Sewer Department
P.O. Box 1209
Haines Alaska 99827
766-2200

Haines Borough

Memo

To: Manager Mark Earnest

From: Scott Bradford

CC: Brain Lemcke

Date: January 4, 2012

Re: Sludge/Screenings

Manager Mark Earnest

With the land fill not taking sludge and screenings at this time, we are looking at our options to dispose of the sludge and screenings. Some of the options are shipping out of town, composting and there may be others that we looking for. Important note is sludge and screenings are treated differently and must be disposed of separately.

Disposal of Sludge:

1. Shipping out of town to another location that is approved to accept sludge. This needs to be looked in to more, for the cost of shipping, type of container, location to ship to etc.

2. Composting is an option and we have done some in house on a trial bases since 2008. It does work and it is done in other towns. (Fairbanks and Ketchikan) more on this.

3. We could develop our own sewage sludge monofill. We would to submit a monofill permit application to DEC following the regulations under 18 AAC 60.470. This is burying in the ground and keeping it covered.

4. Other options.

Disposal of Screenings:

1. Shipping out of town same problems as above with sludge. To reduce the volume and wait we would need a better screening system that does a better job of cleaning the screenings and to dewater the screens. This would make them lot lighter and reduce the volume. This could be bagged and shipped.

2. Monofill same as above.

3. Other options.

HDR during there short visit had some thoughts on the screenings and sludge. There services would be a great help and what ever we decide to do we will need to submit a plan to DEC for there approval and HDR could be a great help with that.

The composting that we have been doing in house for the last 3 years has been and in vessel composting and the way we have doing it is vary labor intensive so it has been done on a limited bases. This could be an option for disposal of our sludge. We would need some equipment, space, course sawdust or wood chips and a plan.

I have included some information from the EPA . http://water.epa.gov/scitech/wastetech/biosolids/503pe_index.cfm

Water and Sewer Plant Operator

Scott Bradford

Chapter 1

Use or Disposal of Sewage Sludge Biosolids

Background on the Part 503 Rule

As required by the Clean Water Act Amendments of 1987, the U.S. Environmental Protection Agency (EPA) developed a new regulation to protect public health and the environment from any reasonably anticipated adverse effects of certain pollutants that might be present in sewage sludge biosolids. This regulation, ***The Standards for the Use or Disposal of Sewage Sludge*** (Title 40 of the Code of Federal Regulations [CFR], Part 503), was published in the ***Federal Register (58 FR 9248 to 9404)*** on February 19, 1993, and became effective on March 22, 1993. This document will refer to the regulation as "the Part 503 rule" and also as "Part 503."

This guidance document is not a substitute for the actual rule, but it is intended as a helpful tool for interpretation and implementation of the rule.

In this document you will notice the nearly exclusive reference to sewage sludge as biosolids. ***Biosolids*** are a primarily organic solid product produced by wastewater treatment processes that can be beneficially recycled. The fact that the biosolids can be recycled does not preclude their being disposed. Whenever the document first quotes portions of the Part

503 rule that include the words "sewage sludge," the word "biosolids" is substituted in brackets (e.g., "[biosolids] incinerator" for sewage sludge incinerator). Subsequently, the word biosolids is used without brackets (e.g., sewage sludge incinerators are called "biosolids incinerators").

The Part 503 rule establishes requirements for the final use or disposal of sewage sludge [biosolids] when biosolids are:

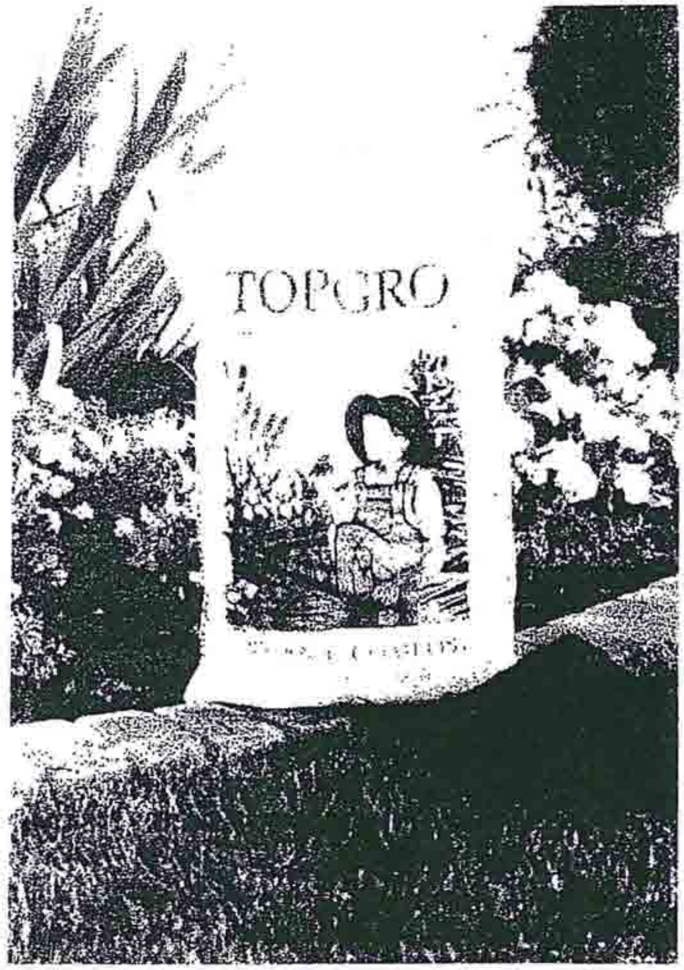
- applied to land to condition the soil or fertilize crops or other vegetation grown in the soil;
- placed on a surface disposal site for final disposal; or
- fired in a biosolids incinerator.

The rule also indicates that if biosolids are placed in a municipal solid waste landfill, the biosolids must meet the provisions of 40 CFR Part 258.

The Part 503 rule was amended on February 25, 1994 (59 FR 9095). The amendment made two changes. It deleted pollutant limits for molybdenum in biosolids applied to land but retained the molybdenum ceiling limits; and in certain situations, it permitted carbon monoxide (CO) monitoring in place of total hydrocarbon (THC) monitoring for biosolids incinerators. Please be aware that there may be further modifications to the currently amended molybdenum and CO provisions as well as changes in other requirements of the rule, mainly involving technical correction and litigation response.

The Part 503 rule is designed to protect public health and the environment from any reasonably anticipated adverse effects of certain pollutants and contaminants that may be present in [biosolids]. The provisions of the Part 503 rule are consistent with EPA's policy of promoting beneficial uses of [biosolids] (see 49 FR 24358, June 12, 1984). Land application takes advantage of the soil conditioning and fertilizing properties of biosolids. A separate EPA booklet (EPA/832-R-93-009), as well as other literature, describes the benefits of using biosolids (see References at the end of this document).

STATE RULES ALSO APPLY TO BIOSOLIDS USE OR DISPOSAL: It is important to note that persons using or disposing of biosolids are subject to State and possibly local regulations as well. Furthermore, these State and other regulations may be more stringent generally than the Federal Part 503 rule, may define biosolids differently, or may regulate certain types of biosolids more stringently than the Part 503 rule. For information on specific State biosolids regulations, consult the appropriate State biosolids permitting authorities listed in Appendix B.



TopGrow organic compost is produced from biosolids and other waste materials by the City of Los Angeles.

Risk Assessment Basis of the Part 503 Rule

Many of the requirements of the Part 503 rule are based on the results of an extensive multimedia risk assessment. This risk assessment was more comprehensive than for any previous Federal biosolids rulemaking effort, the earliest of which began in the mid-1970s. Research results and operating experience over the past 25 years have greatly expanded EPA's understanding of the risks and benefits of using or disposing of biosolids.

Development of the Part 503 rule began in 1984. During this extensive effort, EPA addressed 25 pollutants using 14 exposure pathways in the risk assessment. In this assessment, EPA also developed a new methodology that provided for the protection of the environment and public health. The new method for conducting the multimedia risk assessment was reviewed and approved by EPA's Science Advisory Board.

EPA proposed the Part 503 rule in February 1989. During the four years between the publication of the proposed and final rule, the data, models, and assumptions used in the risk assessment process were reviewed and revised in an effort involving internationally recognized experts working closely with EPA. EPA feels this process has resulted in the establishment of state-of-the-art risk-based standards for controlling the use or disposal of biosolids.

Detailed information describing the risk assessment and technical basis of the Part 503 standards is contained in the Preamble to the Part 503 rule and in several Technical Support Documents, available from the National Technical Information Service (NTIS) (see References at the end of this document).

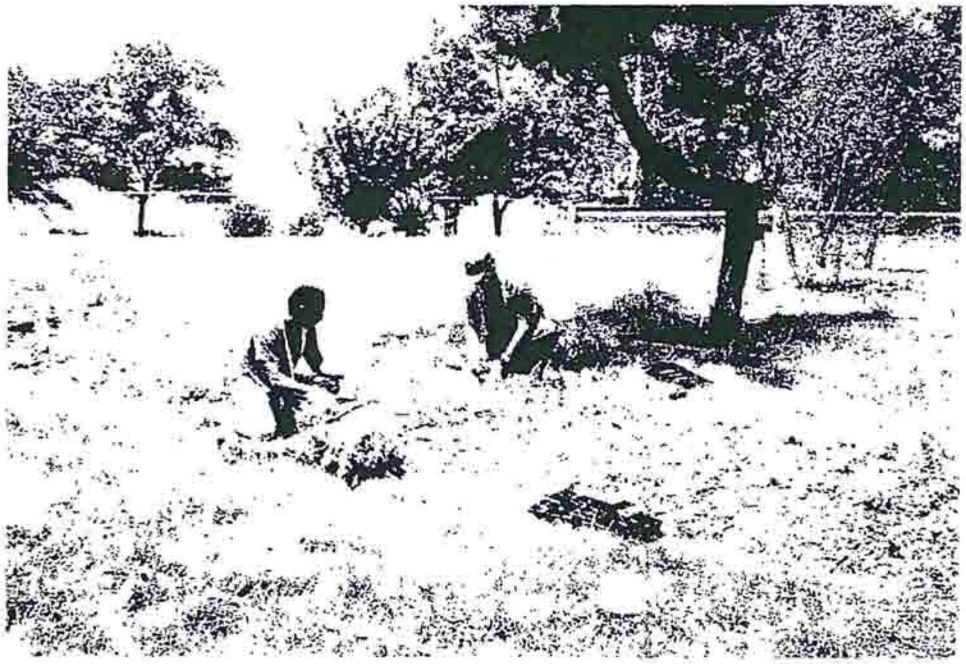
Purpose of This Document

The purpose of this document is to explain the intent and requirements of the Part 503 rule and to assist owner/operators in determining the extent to which their biosolids management operation is covered. To help clarify the intent of the Part 503 rule, this guidance document sometimes uses terms that do not appear in the rule itself and organizes information differently from the rule. For example, Chapter Two first describes land application of biosolids with the fewest regulatory requirements, then provides a discussion of land application of biosolids for which more regulatory requirements apply.

CAUTION! This document does not serve as a substitute for the actual Part 503 rule and its amendments published in the *Federal Register* and the *Code of Federal Regulations.* Rather, this document is intended to be used as guidance to assist users or disposers of sewage sludge in complying with the rule. In addition, official interpretations of various portions of Part 503 may change after the publication of this guidance document. For clarification on any discussion contained in this guidance document, the actual rule and the appropriate EPA Regional [biosolids] permitting authorities listed in Appendix B should be consulted.

What Are Sewage Sludge Biosolids?

Part 503 defines ***sewage sludge*** as a solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes scum or solids removed in primary, secondary, or advanced wastewater treatment processes and any material derived from sewage sludge (e.g., a blended sewage sludge/fertilizer product) but does not include grit and screenings or ash generated by the firing of sewage



Department of Transportation personnel plant flowers in composted biosolids beds at La Guardia Airport, New York.

sludge in an incinerator. Part 503 considers domestic septage as sewage sludge and sets separate requirements for domestic septage applied to agricultural land, forests, or reclamation sites. ***Domestic septage*** is defined as a liquid or solid material removed from a septic tank, cesspool, portable toilet, Type III marine sanitation device, or similar system that receives only domestic sewage. The Part 503 definition of domestic septage excludes grease-trap pumpings and commercial or industrial waste. As previously stated, this guidance document refers to sewage sludge as biosolids to emphasize the beneficial nature of this recyclable biological resource.

Overview of the Rule

The Part 503 rule includes five subparts: general provisions, and requirements for land application, surface disposal, pathogen and vector attraction reduction, and incineration. For each of the regulated use or disposal practices, a Part 503 standard includes general requirements, pollutant limits, management practices, operational standards, and requirements for the frequency of monitoring, recordkeeping, and reporting, as shown in Figure 1-1. For the most part, the requirements of the Part 503 rule are self-implementing and must be followed even without the issuance of a permit.

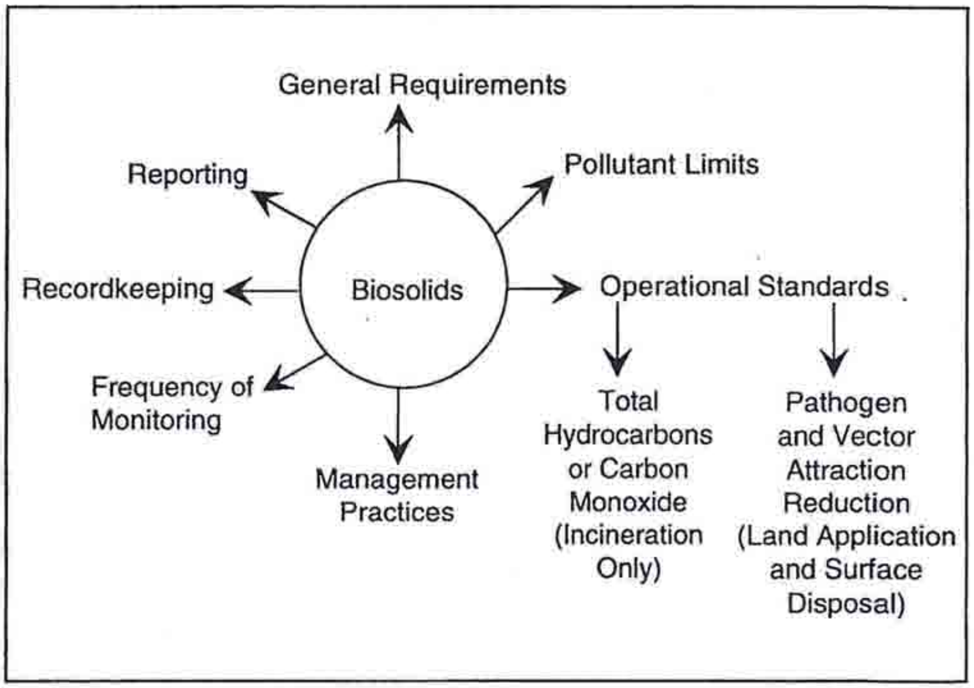


Figure 1-1. What a Part 503 standard includes.

Subpart A—General Provisions

Subpart A of the rule covers general provisions, such as the purpose and applicability of the rule, the compliance period, and exclusions from the rule. These general provisions apply to each of the three biosolids use or disposal practices.

Subpart B—Requirements for Land Application

Options for Land Application of [Biosolids] Under Subpart B:
Subpart B of the rule specifies requirements for biosolids applied to land. The term ***apply*** means to put biosolids on the land to take advantage of the nutrient content or soil conditioning properties of the biosolids.

The requirements for land application also pertain to material ***derived*** from biosolids; that is, biosolids that have undergone a change in quality through treatment (e.g., composting) or by mixing with other materials (e.g., wood chips, municipal solid waste, yard waste).

The biosolids land application requirements, which are explained in detail in Chapter Two of this guidance document, are summarized below. (See also ***Process Design Manual: Land Application of Sewage Sludge and Domestic Septage.*** U.S. EPA, Center for Environmental Research Information, Cincinnati, OH. Expected to be available in early 1995.) There are several options for land applying biosolids under Subpart B of the Part

503 rule, all of which are equally protective of human health and the environment. This guidance discusses these options in order of increasing regulatory complexity.

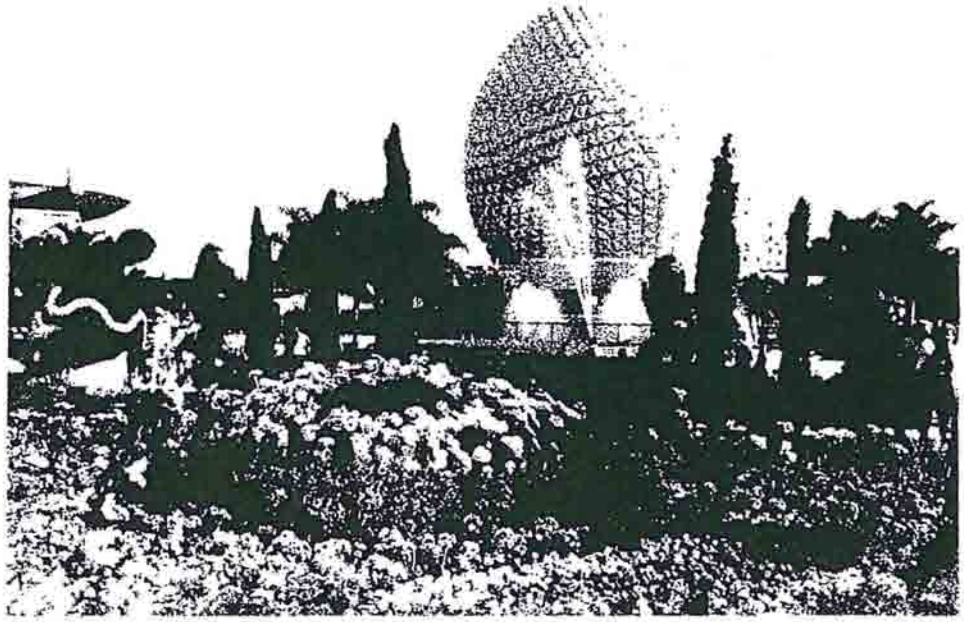
1 **Exceptional Quality Biosolids:** Although not explicitly defined in the Part 503 rule, this document uses the term ***Exceptional Quality (EQ)*** to characterize biosolids that meet low-pollutant and Class A pathogen reduction (virtual absence of pathogens) limits and that have a reduced level of degradable compounds that attract vectors. Once the requirements discussed in detail in Chapter Two are met, EQ biosolids are considered a product that is virtually unregulated for use, whether used in bulk, or sold or given away in bags or other containers.

2 **Pollutant Concentration Biosolids:** Although not explicitly defined in the Part 503 rule, this document uses the term ***Pollutant Concentration (PC)*** to refer to biosolids that meet the same low-pollutant concentration limits as EQ biosolids, but only meet Class B pathogen reduction and/or are subjected to site management practices rather than treatment options to reduce vector attraction properties. Unlike EQ biosolids, PC biosolids may only be applied in bulk and are subject to general requirements and management practices; however, tracking of pollutant loadings to the land is not required.

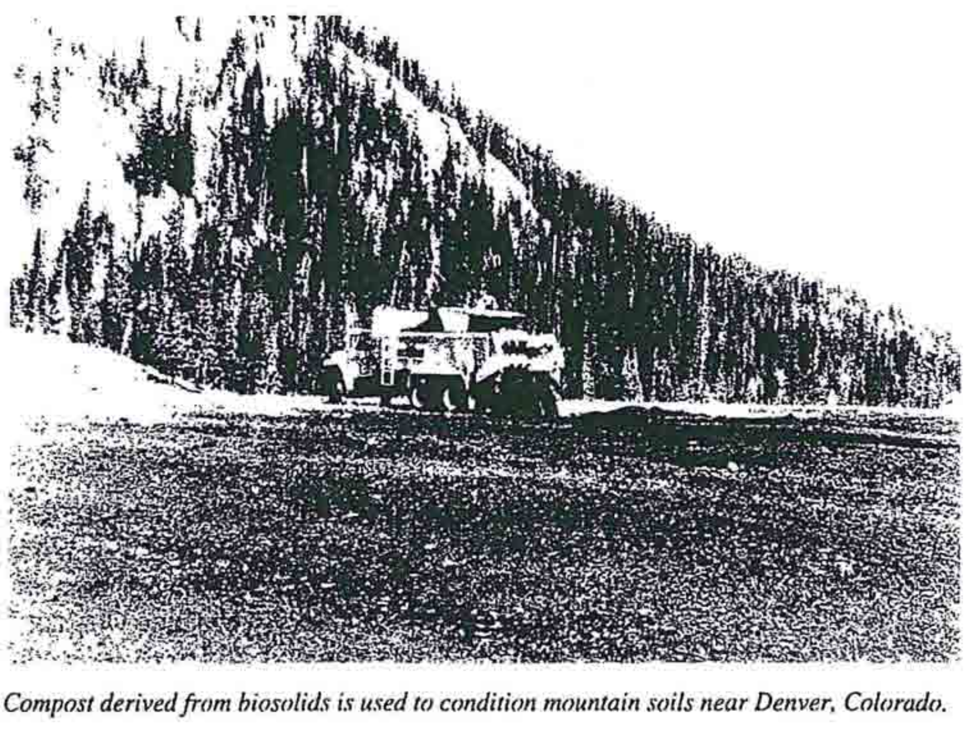
A majority of the biosolids currently generated in the United States are believed to be EQ or PC biosolids containing low levels of pollutants. EPA expects that many municipalities will strive to produce EQ or PC biosolids because of the reduced regulatory requirements and the anticipated improved public perception about using EQ and PC biosolids beneficially. Cumulative levels of pollutants added to land by EQ or PC biosolids do not have to be tracked because the risk assessment has shown that the life of a site would be at least 100 to 300 years under the conservative parameters assumed.

3 **Cumulative Pollutant Loading Rate (CPLR) [Biosolids]:** CPLR biosolids typically exceed at least one of the pollutant concentration limits for EQ and PC biosolids but meet the ceiling concentration limits (see Chapter Two). Such biosolids must be applied to land in bulk form. The cumulative levels of biosolids pollutants applied to each site must be tracked and cannot exceed the CPLR.

4 **Annual Pollutant Loading Rate (APLR) [Biosolids]:** APLR biosolids are biosolids that are sold or given away in a bag or other container for application to the land that exceed the pollutant limits for EQ biosolids but meet the ceiling concentration limits (see Chapter Two). These biosolids must meet APLR requirements and must be accompanied by specific biosolids application rate information on a label or handout that includes instructions on the material's proper use.



Biosolids compost enhances gardens at Walt Disney World Epcot Center in Orlando, Florida.



Compost derived from biosolids is used to condition mountain soils near Denver, Colorado.

Each of the options for land applying biosolids are affected by the Part 503 February 25, 1994, amendment, which states that EPA is reconsidering appropriate land application and pollutant limits for molybdenum.

During the period of reconsideration, only ceiling limits for molybdenum must be met. Molybdenum pollutant limits for EQ, PC, CPLR, or APLR biosolids have been deleted.

Options for Using or Disposing of Domestic Septage Under Subpart B: If domestic septage is applied to land with a high potential for contact by the public (e.g., public parks, ball fields, cemeteries, plant nurseries, and golf courses), the Part 503 land application requirements apply. However, when domestic septage is applied to nonpublic contact sites (e.g., agricultural land, forests, and reclamation sites), less burdensome requirements may apply. A separate EPA guidance document, entitled ***Domestic Septage Regulatory Guidance: A Guide to the EPA 503 Rule,*** provides detailed guidance on how to comply with these requirements.

Subpart C—Requirements for Sewage Sludge Placed on a Surface Disposal Site

Subpart C of the rule covers requirements for biosolids—including domestic septage—placed on a surface disposal site.

Placement refers to the act of putting biosolids on a parcel of land at high rates for final disposal rather than using the organic content in the biosolids to condition the soil or using the nutrients in the biosolids to fertilize crops. Placing biosolids in a monofill, in a surface impoundment, on a waste pile, or on a dedicated site is considered surface disposal.

Treatment and ***storage*** of biosolids are not considered surface disposal. ***Treatment*** is the preparation of biosolids for final use or disposal through such activities as thickening, stabilization, and dewatering. ***Storage*** is the placement of biosolids on the land for 2 years or less. Placement on land for longer than 2 years is considered surface disposal unless the site owner/operator retains written records demonstrating clearly to the permitting authority that the area of land onto which biosolids are placed is not a surface disposal site but rather, based on management or operational practices, constitutes a treatment or temporary storage site.

Surface disposal requirements and the difference between disposal, treatment, and storage of biosolids are explained in Chapter Three of this document. (See also ***Process Design Manual: Land Application of Sewage Sludge and Domestic Septage.***)

Certain materials ***derived*** from biosolids, the quality of which has been changed by treating the biosolids or by mixing them with other materials (e.g., wood chips), are subject to the surface disposal requirements in Part 503 with one exception. If biosolids are mixed with nonhazardous solid wastes, the mixture and the land onto which the mixture is placed are subject to the solid waste regulations (40 CFR Part 258) instead of Part 503.

Subpart D—Requirements for Pathogen and Vector Attraction Reduction

Subpart D of the Part 503 rule covers requirements for the control of disease-causing organisms, called ***pathogens***, in biosolids and the reduction of the attractiveness of biosolids to ***vectors***, such as flies, mosquitoes, and other potential disease-carrying organisms. These requirements are described in Chapter Five of this document. Pathogen and vector attraction reduction requirements also are briefly described for biosolids applied to land or placed on a surface disposal site in Chapters Two and Three of this document. More detailed guidance on meeting pathogen and vector attraction reduction requirements is provided in another EPA publication (see References, EPA/625-R-92-013).

Subpart E—Requirements for Sewage Sludge Fired in a Sewage Sludge Incinerator

Subpart E of the rule covers the requirements for biosolids fired in a [biosolids] incinerator. The firing of biosolids with auxiliary fuels also is covered by the Part 503 incineration requirements. ***Auxiliary fuel*** materials include gas, oil, coal, and other materials that serve as a fuel source.

The co-firing of biosolids in an incinerator with other wastes is generally not regulated under Part 503. It should be noted, however, that wastes either in auxiliary fuel or mixed and co-fired with biosolids are considered to be auxiliary fuel when the weight is less than or equal to 30 percent (by dry weight) of the total biosolids and auxiliary fuel mixture. The requirements in Subpart E for biosolids incineration are discussed in Chapter Four.

The February 25, 1994, amendment to the Part 503 rule states that under certain conditions EPA will allow continuous monitoring of carbon monoxide emissions from biosolids incinerators as an alternate to continuous monitoring of total hydrocarbons in emissions. The details of the amendment are also discussed in Chapter Four.

To Whom the Rule Applies

Part 503 applies to any person who applies biosolids to the land or fires biosolids in a biosolids incinerator, and to the owner/operator of a surface disposal site, or to any person who is a preparer of biosolids for use, incineration, or disposal. Part 503 defines a ***person*** as an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof. A ***preparer*** is a person who generates or derives a material from biosolids (i.e., changes the quality of biosolids).

Exclusions from the Rule

Part 503 specifies certain exclusions from the rule. These exclusions are listed in Figure 1-2. Also listed in Figure 1-2 are the Federal regulations that apply to biosolids-related activities not covered by the Part 503 rule.

Permits

Self-Implementing Nature of the Rule

In most cases, the Part 503 rule is ***self-implementing***—that is, preparers, land appliers, owner/operators of surface disposal sites, or biosolids incinerators, and other users or disposers of biosolids must comply with the Part 503 rule (including the compliance dates listed in Table 1-2), even if they have not been issued a permit covering biosolids use or disposal requirements. Similarly, EPA (or an approved State) can take enforcement actions directly against persons who violate the Part 503 requirements.

Who Must Apply for a Permit

A person must apply for a permit covering biosolids use or disposal standards if they own or operate a treatment works treating domestic sewage. A person is an owner or operator of a ***treatment works treating domestic sewage*** (TWTDS) if the facility generates, changes the quality of, or provides final disposition of solids, practices for which are ultimately subject to the Part 503 rule.

Table 1-1 provides a more detailed summary of who does and does not have to apply for a Federal permit. Appendix A lists the type of information that should be provided in a permit application. Interim application forms are available from EPA's Office of Wastewater Management.

In most cases, Part 503 requirements will be incorporated over time into National Pollutant Discharge Elimination System (NPDES) permits issued to publicly owned treatment works (POTWs) and TWTDSs. As decided by the permitting priorities of EPA Regions and approved States, "biosolids-only" permits covering applicable Part 503 requirements are likely to be issued to non-NPDES facilities as well. A permit applicant who has not received a response from EPA should continue to comply with the applicable provisions of the Part 503 rule.

FIGURE 1-2
Exclusions from Part 503

Part 503 Does Not Include Requirements For:	Applicable Federal Regulation
Treatment of Biosolids Processes used to treat sewage sludge prior to final use or disposal (e.g.. thickening, dewatering, storage, heat drying).	None (except for operational parameters used to meet the Part 503 pathogen and vector attraction reduction requirements)
Selection of Use or Disposal Practice The selection of a biosolids use or disposal practice.	None (the determination of the biosolids use or the disposal practice is a local decision)
Incineration of Biosolids with Other Wastes Biosolids co-fired in an incinerator with other wastes (other than as an auxiliary fuel).	40 CFR Parts 60, 61
Storage of Biosolids Placement of biosolids on land for 2 years or less (or longer when demonstrated not to be a surface disposal site but rather, based on practices, constitutes treatment or temporary storage).	None
Industrial Sludge Sludge generated at an industrial facility during the treatment of industrial wastewater with or without combined domestic sewage.	40 CFR Part 257 if land applied 40 CFR Part 258 if placed in a municipal solid waste landfill
Hazardous Sewage Sludge Sewage sludge determined to be hazardous in accordance with 40 CFR Part 261, *Identification and Listing of Hazardous Waste.*	40 CFR Parts 261-268
Sewage Sludge Containing PCBs ≥50 mg/kg Sewage sludge with a concentration of polychlorinated biphenyls (PCBs) equal to or greater than 50 milligrams per kilogram of total solids (dry-weight basis).	40 CFR Part 761
Incinerator Ash Ash generated during the firing of biosolids in a biosolid incinerator.	40 CFR Part 257 if land applied 40 CFR Part 258 if placed in a municipal solid waste landfill or 40 CFR Parts 261-268 if hazardous
Grit and Screenings Grit (e.g., sand, gravel, cinders) or screenings (e.g., relatively large materials such as rags) generated during preliminary treatment of domestic sewage in a treatment works.	40 CFR Part 257 if land applied 40 CFR Part 258 if placed in a municipal solid waste landfill
Drinking Water Sludge Sludge generated during the treatment of either surface water or ground water used for drinking water.	40 CFR Part 257 if land applied 40 CFR Part 258 if placed in a municipal solid waste landfill
Certain Non-domestic Septage Septage that contains industrial or commercial septage, including grease-trap pumpings.	40 CFR Part 257 if land applied 40 CFR Part 258 if placed in a municipal solid waste landfill

TABLE 1-1
Who Must Apply for a Permit?

Treatment Works Treating Domestic Sewage (TWTDS) *Required* to Apply for a Permit
All generators of biosolids that are regulated by Part 503 (including all POTWs)
Industrial facilities that *separately* treat domestic sewage and generate biosolids that are regulated by Part 503
All surface disposal site owner/operators
All biosolids incinerator owner/operators
Any person (e.g., individual, corporation, or government entity) who changes the quality of biosolids regulated by Part 503 (e.g., biosolids blenders or processors)[a]
Any other person or facility designated by the permitting authority as a TWTDS

TWTDS and Other Persons *Not Automatically Required* To Apply for a Permit[b]
Biosolids land appliers, haulers, persons who store, or transporters who do not generate or do not change the quality of the biosolids
Land owners of property on which biosolids are applied
Domestic septage pumpers/haulers/treaters/appliers
Biosolids packagers/baggers (who do not change the quality of the biosolids)

[a] If all the biosolids received by a biosolids blender or composter are exceptional quality (EQ) biosolids (see Chapter Two for full explanation of EQ biosolids), then no permit will be required for the person who receives or processes the EQ biosolids.

[b] EPA may request permit applications from these facilities when necessary to protect public health and the environment from reasonably anticipated effects of pollutants that may be present in biosolids.

Site-Specific Permit Limits

Biosolids incinerator owner/operators are required to have site-specific pollutant limits in their permits, and certain surface disposal sites with unique site conditions may also apply for site-specific pollutant limits. Site-specific permit limits are not allowed for land application sites; to the extent the owner of a land application site desires permit limits exceeding pollutant ceiling concentrations, the site may be more appropriately addressed as a surface disposal site (and subject to the Part 503 requirements for surface disposal).

Who Issues the Permit?

At the time this guidance document was published, the permitting authority for Part 503 was EPA. Thus, applications for a Federal biosolids permit must be submitted to the appropriate EPA Regional Office, not the State. This will remain the case until the biosolids management programs of individual States are approved by EPA. Until a State has an EPA-approved program, EPA will remain the permitting authority.

Note that State laws regarding the use or disposal of biosolids, including permit requirements, must be complied with, even if the State program has not received Federal approval.

Unless Otherwise Specified by the Permitting Authority

There are a number of places in the Part 503 rule that indicate ***unless otherwise specified by the permitting authority.*** For example, two instances where a permitting authority could be asked to establish different requirements are: (i) to apply biosolids to reclamation sites in excess of the agronomic rate, or (ii) to apply biosolids closer than 10 meters to waters of the United States. The permitting authority could establish such different requirements for biosolids use or disposal through a permit or other enforceable means on a case-by-case basis (e.g., a letter of approval under the authority of Section 308 of the Clean Water Act [CWA] or a settlement agreement).

Compliance with, and Enforcement of, the Rule

Compliance deadlines under the Part 503 rule vary according to the type of requirement (e.g., compliance dates for frequency of monitoring and for recordkeeping and reporting requirements differ from compliance dates for other requirements) and whether new pollution control facilities will have to be constructed to meet the requirement. Compliance dates for all Part 503 requirements are provided in Table 1-2.

To ensure compliance with Part 503, regulatory authorities have the right to inspect operations involved in the use or disposal of biosolids; review and evaluate required reports and records; sample biosolids at regulated facilities; and respond to complaints from persons affected by an alleged improper use or disposal of biosolids. If records are not kept or other Part 503 requirements are not met, EPA can initiate enforcement actions.

Violations of the Part 503 requirements are subject to the same sanctions as wastewater effluent discharge violations—EPA can sue in civil court and seek remediation and penalties, and it can prosecute willful or negligent violations as criminal acts. If a problem occurred (e.g., ground-water

TABLE 1-2
Compliance Dates for Part 503 Requirements

Part 503 Requirement	Compliance Date
Land Application and Surface Disposal	
Initial monitoring and recordkeeping	July 20, 1993
All other requirements *when current pollution control facilities are adequate to meet requirements, including initial reporting when required*	February 19, 1994
All other requirements *when construction of new pollution control facilities is needed to meet requirements*	February 19, 1995
Incineration	
Initial monitoring, recordkeeping, and reporting (except for total hydrocarbons [THC] or carbon monoxide [CO])	July 20, 1993
All other requirements, including frequency of monitoring, recordkeeping, and reporting for THC (or CO), *when current pollution control facilities are adequate to meet requirements*	February 19, 1994
All other requirements, including frequency of monitoring, recordkeeping, and reporting for THC (or CO), *when construction of new pollution control facilities is needed to meet requirements*	February 19, 1995

contamination), the government could seek to have the offending party correct the situation. EPA can pursue civil fines of up to $25,000 per day, per violation (a single violation that occurs over a 1-year period could result in a fine of over $9 million). Filing a false report carries a fine of up to $10,000 and up to 2 years in prison. Negligent violations carry a criminal fine of $2,500 to $25,000 per day of violation and up to 1 year in prison. Willful violations carry a criminal fine of $5,000 to $50,000 per day of violation and up to 3 years in prison.

Finally, where EPA is unable to take an enforcement action, Section 505 of the CWA authorizes any citizen (e.g., a landowner, neighbor, lending institution) to bring a civil action against the violator for corrective action and/or the same penalties that EPA could have sought (i.e., $25,000 per violation per day).

Who Must Report

The Part 503 rule includes reporting requirements only for the following types of facilities:

- Publicly owned treatment works (POTWs) with a design flow rate equal to or greater than 1 mgd;

POTWs that serve a population of 10,000 or greater, and

Class 1 [biosolids] management facilities that are POTWs required to have an approved pretreatment program (5 mgd or greater as per 40 CFR Part 403.3[a]) and POTWs located in states that have elected to assume local program responsibilities for pretreatment (140 CFR 403.10[e]), and treatment works processing domestic sewage (TWTDS) that EPA and/or the State have classified as Class 1 because of the potential to negatively affect public health and the environment.

Relationship of the Federal Requirements to State Requirements

Part 503 does not replace any existing State regulations; rather, it sets minimum national standards for the use or disposal of biosolids. In some cases, the State requirements may be more restrictive or administered in a manner different from the Federal regulation.

States can change their regulations to meet the minimum Federal standards. EPA will be working with States to encourage them to gain approval for administering the Part 503 rule. States can apply to EPA for approval of a biosolids program at any time, but they are under no obligation to do so.

Knowing exactly which State or Federal rules to follow can sometimes be complicated. Users or disposers of biosolids should keep the following situations in mind when considering the applicability of requirements:

In all cases, users or disposers of biosolids must comply with all applicable requirements of the new Federal rule (Part 503), as explained in this document.

If a State has its own rules governing the use or disposal of biosolids and has not yet adopted the Federal rule, the owner/operator will have to follow the most restrictive portions of both the Federal and State rules.

Users or disposers of biosolids are strongly encouraged to check with the appropriate sewage sludge [biosolids] coordinator (listed in Appendix B) regarding the specific State requirements.

Assistance with Technical, Permitting, and Compliance Issues

EPA will provide technical information and assistance on the Part 503 regulation. Also, on occasion EPA can provide project-specific assistance on biosolids use or disposal. The following EPA personnel and offices can provide assistance in the subject areas indicated.

Permitting

Wendy Miller (202) 260-3716
Wendy Bell (202) 260-9534
Regional & State Sewage Sludge [Biosolids] Coordinators (see Appendix B)

Compliance Monitoring and Enforcement

Joe Theis (Enforcement) (202) 260-8185
George Gray (Compliance) (202) 260-8313
Regional & State Sewage Sludge [Biosolids] Coordinators (see Appendix B)

Sampling & Analysis

Cristina Gaines (202) 260-6284

Incineration

Cristina Gaines (202) 260-6284
Wendy Bell (202) 260-9534

Beneficial Use and Biosolids Management Technology Issues

John Walker (202) 260-7283
Bob Bastian (202) 260-7378

Pretreatment/Removal Credits

Louis Eby (202) 260-2991

Technical Guidance for Incineration

Cristina Gaines (202) 260-6284

Dewatering

Jim Smith (513) 569-7355

Pathogen & Vector Control

Jim Smith (513) 569-7355
Bob Bastian (202) 260-7378
Bob Southworth (202) 260-7157

Odor Control, Composting, Bioaerosols

John Walker (202) 260-7283

Part 503 Regulation Development

Bob Southworth (202) 260-7157
Alan Hais (202) 260-1306

Risk Assessment

Jim Ryan (513) 569-7653
Bob Southworth (202) 260-7157
John Walker (202) 260-7283

Biosolids Publications

Sharie Centilla (202) 260-6052
Bernita Starks (202) 260-7287

For Further Information: See "References" listed after Chapter Six.

Common Questions and Answers

Q: If an industrial facility has separate treatment works for its domestic sewage and its process wastewater, are the biosolids generated from both treatment processes covered under Part 503?

A: No. Only the biosolids from the domestic sewage treatment process would be covered by Part 503 if used or disposed through land application, surface disposal, or solid incineration. The sludge from the industrial wastewater treatment process would not be covered. In fact, even if domestic sewage is mixed and treated in an industrial treatment works, the sludge from that system is not covered by Part 503.

Q: If a publicly owned treatment works (POTW) has only industrial wastewater influent, is the sludge generated at this treatment works considered sewage sludge [biosolids] and covered under the Part 503 rule?

A: No. By definition, the sludge is not sewage sludge [biosolids] because it is not a residual from the treatment of domestic sewage, but industrial wastewater. See Section 503.6(d).

Q: If the influent from a POTW or any treatment works other than an industrial facility is 99 percent industrial wastewater and only 1 percent domestic wastewater, are the biosolids generated at the treatment works sewage sludge covered under Part 503?

A: Yes. Because any domestic content in the wastewater being treated in a facility other than an industrial facility brings the biosolids generated within the scope of Part 503 if used or disposed through land application, surface disposal, or biosolids incineration.

Q: What does "new pollution control facilities" mean as referred to in Section 503.2?

A: A ***new pollution control facility*** is any building, structure, facility, or installation from which there is or may be a discharge of pollutants, the construction of which must have begun after the promulgation of Part 503. A new pollution control facility includes any building, structure, or installation that replaces or substantially upgrades the process or production equipment necessary to meet a standard under this Part. An example of an acceptable new pollution control facility is the installation of an incinerator afterburner.

New pollution control facilities do not include:

(1) replacement of any building, structure, or installation due to normal operational wear and tear;

(2) installation of monitoring equipment or devices, including the purchase of computer hardware or software for monitoring purposes; or

(3) purchase of a special truck for land application of biosolids.

The permitting authority should be consulted for specific determinations.

Q: If a treatment works is able to comply immediately with the standards for one use or disposal practice covered under Part 503 but would like to construct devices necessary for compliance with another use or disposal practice, does that treatment works have 2 years to achieve compliance? For example, if a treatment works needs 2 years to build pollution control processes, is that facility allowed to use or dispose biosolids that violate the requirements of Part 503 for 2 years?

A: The treatment works may have up to 2 years to achieve compliance (i.e., until February 19, 1995—2 years after promulgation of the Part 503 rule) only for that use for which is requires construction. In all other instances, the treatment works must comply with Part 503 by the February 19, 1994, deadline. Thus, in the above example, if the treatment works is converting from surface disposal to incineration, the biosolids disposed until the incinerator comes on line must comply with surface disposal requirements under Subpart C of the Part 503 rule.

Q: Suppose the only practice followed by a treatment works has been incineration and the treatment works cannot meet the 503 incinerator requirements without construction of new pollution control devices (e.g., a wet electrostatic scrubber), would the treatment works have until February 19, 1995 (2 years) to come into compliance?

A: Yes.

Q: Suppose the only practice followed at a treatment works is land application and the biosolids (a) cannot meet the pollutant ceiling limits or (b) have been aerobically digested and cannot meet either the pathogen reduction or the vector attraction reduction requirements. Would that treatment works have until February 19, 1995 (2 years) to come into compliance?

A: (a) Possibly yes if the owner/operator of a treatment works could demonstrate that he or she had no other readily available alternative, such as shifting to a surface disposal operation or diluting the biosolids with other material prior to land use. (b) Probably no, because the treatment works could likely have readily provided pathogen and vector attraction reduction by using an additive process, such as lime stabilization, or alternatively by soil incorporation for vector attraction reduction.

Q: If the POTW gives/sells biosolids to a farmer, will the farmer be required to be permitted? How is the "poor farmer" going to know he has to keep records for 5 years?

A: The owner/operator of a treatment works treating domestic sewage (TWTDS) must apply for a permit if the biosolids being generated/disposed are regulated by Part 503. The Preamble to Part 122 addresses what is considered a TWTDS. Excluded from this definition are land appliers who do not change the quality of the biosolids prior to land application. Therefore, if a POTW provides a farmer with biosolids and the farmer merely land applies the biosolids, the farmer will not have to apply for a permit. There may be some requirements, however, that apply directly to the farmer under Part 503 (e.g., recordkeeping). The POTW is required to provide notice and necessary information to the farmer to ensure that the Part 503 requirements are met. This provision was included in Part 503 specifically to ensure that all parties involved in the land application of biosolids are aware of the requirements.

Q: How can the State continue to include in an NPDES permit State biosolids requirements that are less stringent than Part 503?

A: If the State has separate authority to include such limits, it can continue to do so. However, such limits will not be Federally enforceable because they are not issued under an approved State program, which would require the State to implement requirements at least as stringent as Part 503. Meanwhile, the permittee would have to follow the most restrictive portions of the State as well as the self-implementing Federal rules.

Q: If States already require cumulative metal loading tracking, will past loading count toward ultimate cumulative metal loadings on the site? If no, what position will EPA take if a State (or Region) chooses to acknowledge past loadings? Will EPA be more willing to support a State on this issue if the State is seeking program approval?

A: Part 503 built in certain assumptions about the background concentrations of metals in developing the limits for cumulative loadings. Because of these assumptions, previous land application of biosolids according to the CPLR concept are not considered prior to July 20, 1993. At that time, the recordkeeping requirements became effective, requiring the regulated community to track cumulative loadings under the Federal program. This requirement, however, will not affect existing State programs that already require tracking. These State requirements would generally be considered more stringent and would need to be complied with under State law. Again, if a State chooses to include pre-Part 503 loadings, EPA will take the position that this is a more stringent State requirement. It will not matter if the State is seeking program approval. However, EPA will be working with all the States to provide an understanding of the Part 503 requirements and to encourage adoption of Part 503 as it exists. The permitting authority may choose to look at past loadings on a case-by-case basis if it determines that a more stringent requirement is necessary to protect public health and the environment from any adverse effect of a pollutant in biosolids.

Q: Can a State prohibit the use or disposal of biosolids generated outside that State? If a State cannot ban the importation of biosolids, how can the receiving State control the quality of biosolids generated in another State? Can it, for example, require analysis of additional pollutant prior to shipment?

A: Although a number of States have attempted to ban the importation of biosolids, the courts have generally struck down such State laws as being contrary to the Commerce Clause of the U.S. Constitution. Furthermore, courts have invalidated laws that discriminate against out-of-State wastes merely because of where those wastes were generated. However, the preparer of biosolids has to notify the permitting authority in the receiving state where the biosolids will be used or disposed. Moreover, the receiving State has the authority to control the use or disposal of biosolids within its borders, regardless of where they are generated. For example, the State could require permits for land application. In this case, anyone who land applies within the State, regardless of where the biosolids come from, would have to obtain a permit. Another option, is to require a joint permit for both the generator and the land applier. However, the State would need to ensure that its legal authority is adequate to go beyond its geographical boundaries.

Q: Does accepting authority for the Part 503 program automatically give the State jurisdiction over out-of-State biosolids that are imported for use or disposal?

A: Program approval does not give the State additional jurisdiction for dealing with out-of-State biosolids. Rather, it merely allows the State to implement the Federal program. The State will have to show that its laws ensure compliance with the Federal program at a minimum. One of the requirements for program approval is that the State demonstrate that it has adequate authority to regulate all biosolids that are used or disposed within its borders—regardless of where that biosolids material is generated. The State would not necessarily be required to regulate all generators of biosolids that are located outside its border, although many States might have this capability.

Q: According to Part 503, the choice of a use or disposal option is a local decision. Does the receiving municipality have some say in the decision to permit land application?

A: If allowed under State law, municipalities also may regulate the use or disposal of biosolids within their borders. The receiving municipality could require a permit or pass an ordinance, such as a zoning or land use requirement, to regulate where biosolids are applied or placed.

Q: If biosolids are sent to a different State that has a permitting program, does the generator have to comply with the other State's requirements?

A: Yes.

Sent: Friday, December 09, 2011 2:21 PM
To: Mark Earnest
Cc: Brian Lemcke; Scott Bradford; Moyers, Ryan; Hawley, Ted
Subject: RE: Geotubes

You are welcome Sir! Looking forward to meeting you and your professional staff on the 21st.

From: Mark Earnest [mailto:mearnest@haines.ak.us]
Sent: Friday, December 09, 2011 3:06 PM
To: Koch, John
Cc: Brian Lemcke; Scott Bradford
Subject: RE: Geotubes

Hi John,

Thank you for sending the link and for the time today on the phone regarding the sludge issue in Haines.

Mark

.

From: Koch, John [mailto:John.Koch@hdrinc.com]
Sent: Friday, December 09, 2011 1:57 PM
To: Mark Earnest
Subject: Geotubes

http://www.tencate.com/5623/TenCate/TenCate-Industrial-Fabrics/Region-North-America/en/Region-North-America-en-Industrial-Fabrics/Geotube-Dewatering

More to follow

JOHN KOCH
P.E., BCEE, CDT

HDR Engineering, Inc.
Vice President

800 Shelter Bay Drive, LaConner, WA 98257
cell: 425-773-1384
John.Koch@hdrinc.com | hdrinc.com
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From: Moyers, Ryan [mailto:Ryan.Moyers@hdrinc.com]
Sent: Friday, December 09, 2011 3:14 PM
To: Mark Earnest
Cc: Brian Lemcke; Scott Bradford; Hawley, Ted; Koch, John
Subject: RE: Geotubes

Gentlemen,

Here is some additional information on the geotubes.
http://www.dewateringsolutions.net/geotubes.htm

I've also attached some photos and plan sheet from the installation in Homer as well as an alternative we looked at recently in Pelican.

Another alternative for an immediate solution that could be utilized in the plant might be Super Sacks:
http://www.bagcorp.com/p_su_ba_fourpanel.php

Let us know if you have any questions on the attachments or would like additional information.

Thanks,
Ryan

J. RYAN MOYERS, P.E. | HDR Alaska, Inc.
Senior Engineer
2525 C Street, #305 | Anchorage, AK 99503
ph: 907.644.2160 | fax: 907.644.2022| cell: 804.400.2422
ryan.moyers@hdrinc.com | hdrinc.com
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J. RYAN MOYERS, P.E. | HDR Alaska, Inc.
Senior Engineer

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ph: 907.644.2160 | fax: 907.644.2022| cell: 804.400.2422
ryan.moyers@hdrinc.com | hdrinc.com
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Scott Bradford

From: Woods, Sandra M (DEC) [sandra.woods@alaska.gov]
Sent: Monday, December 19, 2011 2:40 PM
To: Scott Bradford
Subject: RE: Geotubes

Plain English guide to the EPA 503 rule.

From: Scott Bradford [mailto:sbradford@haines.ak.us]
Sent: Monday, December 19, 2011 2:36 PM
To: Woods, Sandra M (DEC)
Subject: FW: Geotubes

From: Moyers, Ryan [mailto:Ryan.Moyers@hdrinc.com]
Sent: Friday, December 09, 2011 3:14 PM
To: Mark Earnest
Cc: Brian Lemcke; Scott Bradford; Hawley, Ted; Koch, John
Subject: RE: Geotubes

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ryan.moyers@hdrinc.com | hdrinc.com
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From: Koch, John
Sent: Friday, December 09, 2011 2:21 PM
To: Mark Earnest

Scott Bradford

From: Woods, Sandra M (DEC) [sandra.woods@alaska.gov]

Sent: Monday, December 19, 2011 2:28 PM

To: Scott Bradford

Subject: RE: Sludge/Screenings

As for the sewage sludge, if you are thinking about creating your own compost with it, I recommend that you come up with an operation plan through HDR engineering and submit it to us for review. To store the compost, you can place it in a covered area that would protect it from the elements. If possible, place it on a tarp or some other type of liner to keep it from seeping into any soil. If you want to permit your own ***sewage sludge monofill***, you would have to submit a monofill permit application to us and follow the regulations under 18 AAC 60.470.

From: Scott Bradford [mailto:sbradford@haines.ak.us]
Sent: Friday, December 16, 2011 10:06 AM
To: Woods, Sandra M (DEC)
Subject: Sludge/Screenings

Hi Sandra
I have some questions on the disposal of sewer sludge and screenings. The local garbage company has informed the Haines Borough that it cannot take any sludge or screenings at this time, I am looking for other ways or ideas to get ride of this stuff. Shipping it out or composting or something. Is there a difference in the way sludge vs screenings should be handled in disposing of. The screenings are ugly and nasty. The sludge makes good compost we have done some on site at the sewer plant a few years ago and with about a 50 – 50 mix sludge and corse sawdust we where getting 160 to 170 degrees for 4 to 6 days etc. We do have HDR coming to town next week to look at this. I just needed some info so I have an idea to take to them about some options.
Thank You
Scott Bradford

Scott Bradford

From: Woods, Sandra M (DEC) [sandra.woods@alaska.gov]
Sent: Monday, December 19, 2011 3:18 PM
To: Scott Bradford
Subject: Lime question

Here's the definition for Class A and Class B Classifications. Biosolids that are sold or given away in a bag or other container for application to land must meet the Class A standards. Biosolids that meet the Class B standards apply to bulk biosolids that are land applied to such areas as agricultural land, forests, public contact sites, or reclamation sites. Biosolids that are placed on a surface disposal site also must meet the Class B pathogen requirements, unless the active biosolids unit on which the biosolids are placed is covered at the end of each operating day (i.e., monofill or landfill). Class B biosolids cannot be given away or sold in bags or other containers.

Look at Tables 5-7 and 5-8 in chapter 5 of the plain English guide to 503 for treating Class B Biosolids.

As to your lime question, the last alternative for reducing Pathogens is Lime stabilization sufficient lime is added to the biosolids to raise the pH of the biosolids to 12 after 2 hours of contact. Biosolids are considered to be adequately reduced in vector attraction if sufficient alkaline material is added to raise the pH to at least 12, measured at 25C and without the addition of more alkaline material, maintain a pH of at least 12 for 2 hours; and maintain pH of at least 11.5 without addition of more alkaline material for an additional 22 hours.

If you were to create composted materials designed to meet the Class B standards, #4 in Table 5-7 Reduce Pathogens would apply. Using either the within vessel, static aerated pile, or windrow composting methods, the temperature of the biosolids is raised to 40C/ 104F or higher and maintained for 5 days. For 4 hours during the 5-day period, the temperature in the compost pile exceeds 55C/131F. Option 5 of Table 5-8 Vector Reduction would be the applicable option to meet the vector reduction requirement. Use aerobic processes at greater than 40C/ 104F for 14 days or longer.

Class A standards are more stringent. See Tables 5-1 and 5-2 for your options.

From: Scott Bradford [mailto:sbradford@haines.ak.us]
Sent: Monday, December 19, 2011 2:36 PM
To: Woods, Sandra M (DEC)
Subject: FW: Geotubes

From: Moyers, Ryan [mailto:Ryan.Moyers@hdrinc.com]
Sent: Friday, December 09, 2011 3:14 PM
To: Mark Earnest
Cc: Brian Lemcke; Scott Bradford; Hawley, Ted; Koch, John
Subject: RE: Geotubes

Gentlemen,

Here is some additional information on the geotubes.
http://www.dewateringsolutions.net/geotubes.htm

Scott Bradford

From: Woods, Sandra M (DEC) [sandra.woods@alaska.gov]
Sent: Monday, December 19, 2011 3:58 PM
To: Scott Bradford
Subject: RE: Geotubes

From: Scott Bradford [mailto:sbradford@haines.ak.us]
Sent: Monday, December 19, 2011 2:36 PM
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I've also attached some photos and plan sheet from the installation in Homer as well as an alternative we looked at recently in Pelican.

Another alternative for an immediate solution that could be utilized in the plant might be Super Sacks:
http://www.bagcorp.com/p_su_ba_fourpanel.php

Let us know if you have any questions on the attachments or would like additional information.

Thanks,
Ryan

J. RYAN MOYERS, P.E.
HDR Alaska, Inc.
Senior Engineer
2525 C Street, #305 | Anchorage, AK 99503
ph: 907.644.2160 | fax: 907.644.2022| cell: 804.400.2422
ryan.moyers@hdrinc.com | hdrinc.com
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From: Koch, John
Sent: Friday, December 09, 2011 2:21 PM
To: Mark Earnest
Cc: Brian Lemcke; Scott Bradford; Moyers, Ryan; Hawley, Ted
Subject: RE: Geotubes

Scott Bradford

From: Woods, Sandra M (DEC) [sandra.woods@alaska.gov]
Sent: Monday, December 19, 2011 4:01 PM
To: Scott Bradford
Subject: RE: Geotubes

Scott, Do you know what happens to the geotubes when they are full? Are they buried or shipped out down south? What are they using in Pelican?

Sandra Woods

From: Scott Bradford [mailto:sbradford@haines.ak.us]
Sent: Monday, December 19, 2011 2:36 PM
To: Woods, Sandra M (DEC)
Subject: FW: Geotubes

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Thanks,
Ryan

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HDR Alaska, Inc.
Senior Engineer
2525 C Street, #305 | Anchorage, AK 99503
ph: 907.644.2160 | fax: 907.644.2022| cell: 804.400.2422
ryan.moyers@hdrinc.com | hdrinc.com
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From: Koch, John

Scott Bradford

From: Woods, Sandra M (DEC) [sandra.woods@alaska.gov]

Sent: Tuesday, December 20, 2011 10:24 AM

To: Scott Bradford

Subject: FW: Geotubes

Sorry about that Scott. Here's the link to "A Plain English Guide to the EPA Part 503 Biosolids Rule." Also, after asking around, I think that the geo tubes are used to heat the biosolids so they meet the heat processing requirements for processing Sewage sludge to the Class A or Class B requirements. The sludge is then removed and used as fertilizer.

http://water.epa.gov/scitech/wastetech/biosolids/503pe_index.cfm

Here are EPA's fact sheets for processing biosolids.
Biosolids Technology Fact Sheet

- Alkaline Stablization of Biosolids (PDF, 9pp., 189Kb)
- Belt Filter Press (PDF, 7pp., 90Kb)
- Centrifuge Thickening & Dewatering (PDF, 8pp., 101Kb)
- Gravity Thickening (PDF, 10pp., 118Kb)
- Heat Drying (PDF, 13pp., 415Kb)
- In-Vessel Composting of Biosolids (PDF, 9pp., 100Kb)
- Land Application of Biosolids (PDF, 9pp., 538Kb) or (Español) (PDF, 13pp., 320Kb)
- Multi Stage Anaerobic Digestion (PDF, 13pp., 251Kb)
- Odor Control in Biosolids Management (PDF, 16pp., 83Kb) or (Español) (PDF, 22pp., 232Kb)
- Recessed-Plate Filter Press (PDF, 7pp., 93Kb)
- Use of Composting for Biosolids Management (PDF, 10pp., 280Kb)
- Use of Incineration for Biosolids Management (PDF, 14pp., 168Kb)
- Use of Land Filling for Biosolids Management (PDF, 8pp., 247Kb)

From: Woods, Sandra M (DEC)
Sent: Monday, December 19, 2011 4:01 PM
To: 'Scott Bradford'
Subject: RE: Geotubes

Scott, Do you know what happens to the geotubes when they are full? Are they buried or shipped out down south? What are they using in Pelican?

Sandra Woods

From: Scott Bradford [mailto:sbradford@haines.ak.us]
Sent: Monday, December 19, 2011 2:36 PM
To: Woods, Sandra M (DEC)
Subject: FW: Geotubes

Scott Bradford

From: Woods, Sandra M (DEC) [sandra.woods@alaska.gov]

Sent: Friday, December 23, 2011 10:08 AM

To: Scott Bradford

Subject: RE: Sludge/Screenings

How did the meeting with the engineers go? I'd like to hear what kind of ideas they had for your community.

Sandra Woods
Solid Waste Program
907-465-5318

From: Scott Bradford [mailto:sbradford@haines.ak.us]
Sent: Friday, December 16, 2011 10:06 AM
To: Woods, Sandra M (DEC)
Subject: Sludge/Screenings

Hi Sandra
I have some questions on the disposal of sewer sludge and screenings. The local garbage company has informed the Haines Borough that it cannot take any sludge or screenings at this time, I am looking for other ways or ideas to get ride of this stuff. Shipping it out or composting or something. Is there a difference in the way sludge vs screenings should be handled in disposing of. The screenings are ugly and nasty. The sludge makes good compost we have done some on site at the sewer plant a few years ago and with about a 50 – 50 mix sludge and corse sawdust we where getting 160 to 170 degrees for 4 to 6 days etc. We do have HDR coming to town next week to look at this. I just needed some info so I have an idea to take to them about some options.
Thank You
Scott Bradford

United States
Environmental Protection
Agency

EPA

Biosolids Technology Fact Sheet

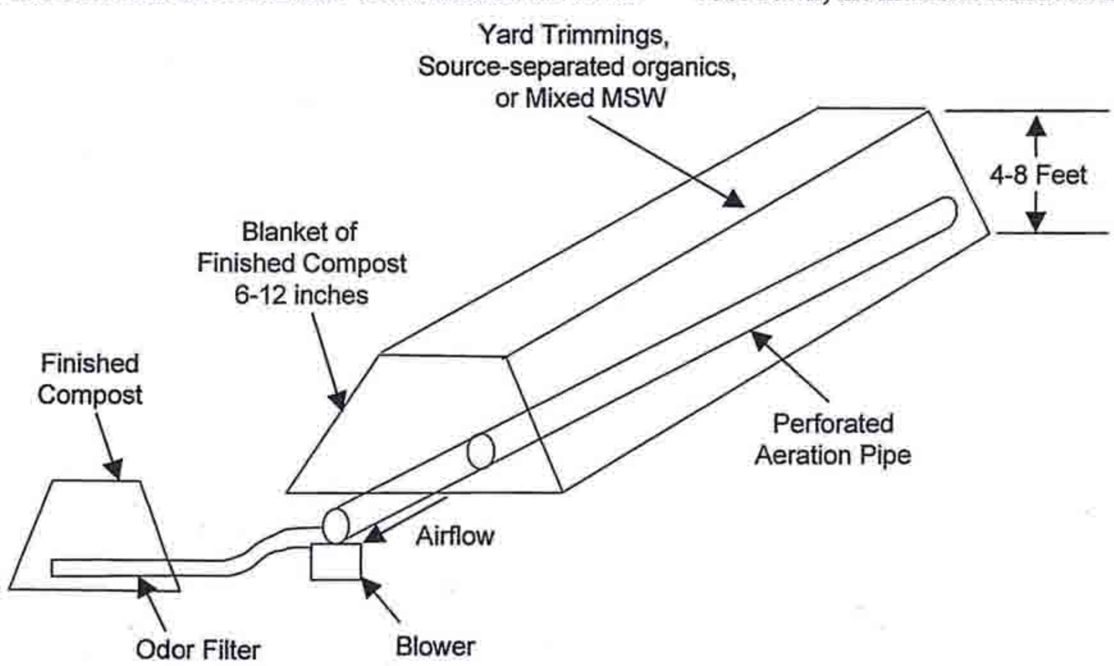
Use of Composting for Biosolids Management

DESCRIPTION

Composting is one of several methods for treating biosolids to create a marketable end product that is easy to handle, store, and use. The end product is usually a Class A, humus-like material without detectable levels of pathogens that can be applied as a soil conditioner and fertilizer to gardens, food and feed crops, and rangelands. This compost provides large quantities of organic matter and nutrients (such as nitrogen and potassium) to the soil, improves soil texture, and elevates soil cation exchange capacity (an indication of the soil's ability to hold nutrients), all characteristics of a good organic fertilizer. Biosolids compost is safe to use and generally has a high degree of acceptability by the public. Thus, it competes well with other bulk and bagged products available to homeowners, landscapers, farmers, and ranchers.

Three methods of composting wastewater residuals into biosolids are common. Each method involves mixing dewatered wastewater solids with a bulking agent to provide carbon and increase porosity. The resulting mixture is piled or placed in a vessel where microbial activity causes the temperature of the mixture to rise during the "active composting" period. The specific temperatures that must be achieved and maintained for successful composting vary based on the method and use of the end product. After active composting, the material is cured and distributed. The three commonly employed composting methods are described in the following paragraphs. A fourth method (static pile) is not recommended for composting wastewater solids based on a lack of operational control.

Aerated Static Pile - Dewatered cake is mechanically mixed with a bulking agent and stacked into long piles over a bed of pipes through which air is transferred to the composting material. After active composting, as the pile is starting to cool down, the material is moved into a curing pile.



Source: Hickman, 1999.

FIGURE 1 SCHEMATIC OF A STATIC-PILE FORCED-AIR COMPOSTING PROCESS

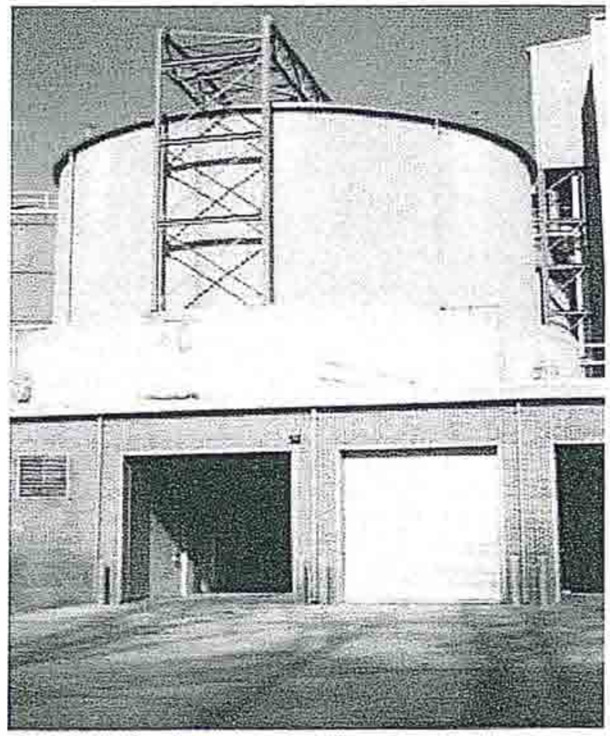
The bulking agent is often reused in this composting method and may be screened before or after curing so that it can be reused.

Windrow - Dewatered wastewater solids are mixed with bulking agent and piled in long rows. Because there is no piping to supply air to the piles, they are mechanically turned to increase the amount of oxygen. This periodic mixing is essential to move outer surfaces of material inward so they are subjected to the higher temperatures deeper in the pile. A number of turning devices are available, including: (1) drums and belts powered by agricultural equipment and pushed or pulled through the composting pile; and (2) self-propelled models that straddle the composting pile. As with aerated static pile composting, the material is moved into curing piles after active composting. Several rows may be laced into a larger pile for curing. Figure 2 shows a typical windrow operation.

Source: Parsons, 2002.

FIGURE 2 WINDROW OPERATIONS ARE TURNED TO PROVIDE ADEQUATE AERATION FOR ACTIVE COMPOSTING

In-Vessel - A mixture of dewatered wastewater solids and bulking agent is fed into a silo, tunnel, channel, or vessel. Augers, conveyors, rams, or other devices are used to aerate, mix, and move the product through the vessel to the discharge point. Air is generally blown into the mixture. After active composting, the finished product is usually stored in a pile for additional curing prior to distribution. A typical composting vessel is shown in Figure 3. This technology is discussed in greater detail in the fact sheet entitled *In-Vessel Composting of Biosolids* (EPA 832-F-00-061).



Source: Parsons, 2002.

FIGURE 3 TYPICAL COMPOSTING VESSEL

All three composting methods require the use of bulking agents, but the type of agent varies. Wood chips, saw dust, and shredded tires are commonly used, but many other materials are suitable. The U.S Composting Council lists the following materials as suitable for use as bulking agents:

- Agricultural by-products, such as manure and bedding from various animals, animal mortalities, and crop residues.
- Yard trimmings, including grass clippings, leaves, weeds, stumps, twigs, tree prunings, Christmas trees, and other vegetative matter from land clearing activities.
- Food by-products, including damaged fruits and vegetables, coffee grounds, peanut hulls, egg shells, and fish residues.
- Industrial by-products from wood processing, forestry, brewery and pharmaceutical operations. Paper goods,

paper mill residues, and biodegradable packaging materials are also used.

- Municipal solid waste.

If municipal solid waste is used in compost, it is put through a mechanical separation process prior to its use to remove non-biodegradable items such as glass, plastics and certain paper goods (USCC, 2000).

The length of time biosolids are composted at a specific temperature is important in determining the eventual use of the compost end product. 40 CFR Part 503, *Standards for the Use and Disposal of Sewage Sludge* (Part 503) defines time and temperature requirements for both Class A and Class B products (Table 1). The production of a Class B product is not always economically justified since the product cannot be used without restrictions and the additional expense to reach Class A requirements can be marginal.

TABLE 1 PART 503 TIME AND TEMPERATURE REQUIREMENTS FOR BIOSOLIDS COMPOSTING

Product	Regulatory Requirements
Class A	**Aerated static pile or in-vessel**: 55 C for at least 3 days **Windrow**: 55 C for at least 15 days with 5 turns
Class B	40 C or higher for five days during which temperature exceed 55 C for at least four hours

Source: 40 CFR Part 503.

If the compost process conforms with the time and temperature requirements to produce a Class A product and the maximum pollutant levels of Part 503 are met, the material is considered "Exceptional Quality" (EQ) biosolids. If used in accordance with sound agronomic and horticultural practices, an EQ biosolids product can be sold in bags or bulk and can be used in household gardens without additional regulatory controls. Class A and EQ biosolids typically have greater marketing success than Class B biosolids. Control of industrial waste streams to wastewater treatment plants (through pretreatment programs) greatly reduces the presence of metals in pre-processed wastewater residuals, enabling compost to meet the stringent EQ standards of Part 503.

If the compost produced is Class B, it can be used at agronomic sites with no public contact, with additional site restrictions. Class A biosolids can be used in home gardens with public contact and no site restrictions. Consistent and predictable product quality is a key factor affecting the marketability of compost (U.S. EPA, 1994). Successful marketing depends on a consistent product quality.

Stability is an important characteristic of a good quality compost. Stability is defined as the level of biological activity in the compost and is measured as oxygen uptake or carbon dioxide production. Oxygen uptake rates of 50 to 80 mg/L are indicative of a stable product with minimal potential for self-heating, malodor generation, or regrowth of pathogen populations. Stability is also indicated by temperature decline, ammonia concentrations, chemical oxygen demand (COD), number of insect eggs, change in odor, and change in redox potential (Haug, 1993).

Stable compost consumes little nitrogen and oxygen and generates little carbon dioxide. Unstable compost consumes nitrogen and oxygen and generates heat, carbon dioxide, and water vapor. Therefore, when unstable compost is applied to soil, it removes nitrogen from the soil, causing a nitrogen deficiency that can be detrimental to plant growth and survival. In addition, if not aerated and stored properly, unstable compost can emit nuisance odors (Epstein, 1998, Garcia, 1991).

APPLICABILITY

The physical characteristics of most biosolids allow for their successful composting. However, many characteristics (including moisture content, volatile solids content, carbon content, nitrogen content, and bulk density) will impact design decisions for the composting method. Both digested and raw solids can be composted, but some degree of digestion (or similar stabilization) is desirable to reduce the potential for generation of foul odors from the composting operation. This is particularly important for aerated static pile and windrow operations. Carbon and nitrogen content of the wastewater solids must be balanced against that of the bulking agent to achieve a suitable carbon to nitrogen ratio of between 25 and 35 parts carbon to one part nitrogen.

Site characteristics make composting more suitable for some wastewater treatment plants than others. An adequate buffer zone from neighboring residents is desirable to reduce the potential for nuisance complaints. In urban and suburban settings, in-vessel technology may be more suitable than other composting technologies because the in-vessel method allows for containment and treatment of air to remove odors before release. The requirement for a relatively small amount of land also increases the applicability of in-vessel composting in these settings.

Another important consideration before selecting the technology to be used for composting is the availability of adequate and suitable manpower. Composting is typically labor-intensive for the following reasons:

- Bulking agents must be added.
- Turning, monitoring, or process control is necessary.
- Feed and finished material(s) must be moved with mechanical equipment.
- Storage piles must be maintained for curing and distribution.
- Bulking agents recovery adds another step.

Finally, proximity to the markets for the resulting compost is desirable, although the usefulness of the final product in home gardening and commercial operations generally makes the material marketable in urban as well as rural areas. This is especially true for good quality material that does not emit foul odors.

ADVANTAGES AND DISADVANTAGES

Biosolids composting has grown in popularity for the following reasons (WEF, 1995):

- Lack of availability of landfill space for solids disposal.
- Composting economics are more favorable when landfill tipping fees escalate.
- Emphasis on beneficial reuse at federal, state, and local levels.
- Ease of storage, handling, and use of composted product.
- Addition of biosolids compost to soil increases the soil's phosphorus, potassium, nitrogen, and organic carbon content.

Composted biosolids can also be used in various land applications. Compost mixed with appropriate additives creates a material useful in wetland and mine land restoration. The high organic matter content and low nitrogen content common in compost provides a strong organic substrate that mimics wetland soils, prevents overloading of nitrogen, and adsorbs ammonium to prevent transport to adjacent surface waters (Peot, 1998). Compost amended strip-mine spoils produce a sustainable cover of appropriate grasses, in contrast to inorganic-only amendments which seldom provide such a good or sustainable cover (Sopper, 1993).

Compost-enriched soil can also help suppress diseases and ward off pests. These beneficial uses of compost can help growers save money, reduce use of pesticides, and conserve natural resources. Compost also plays a role in bioremediation of hazardous sites and pollution prevention. Compost has proven effective in degrading or altering many types of contaminants, such as wood-preservatives, solvents, heavy metals, pesticides, petroleum products, and explosives. Some municipalities are using compost to filter stormwater runoff before it is discharged to remove hazardous chemicals picked up when stormwater flows over surfaces such as roads, parking lots, and lawns. Additional uses for compost include soil mulch for erosion control, silviculture crop establishment, and sod production media (U.S. EPA, 1997a).

Limitations of biosolids composting may include:

- Odor production at the composting site.
- Survival and presence of primary pathogens in the product.
- Dispersion of secondary pathogens such as *Aspergillus fumigatus*, particulate matter, other airborne allergens.
- Lack of consistency in product quality with reference to metals, stability, and maturity.

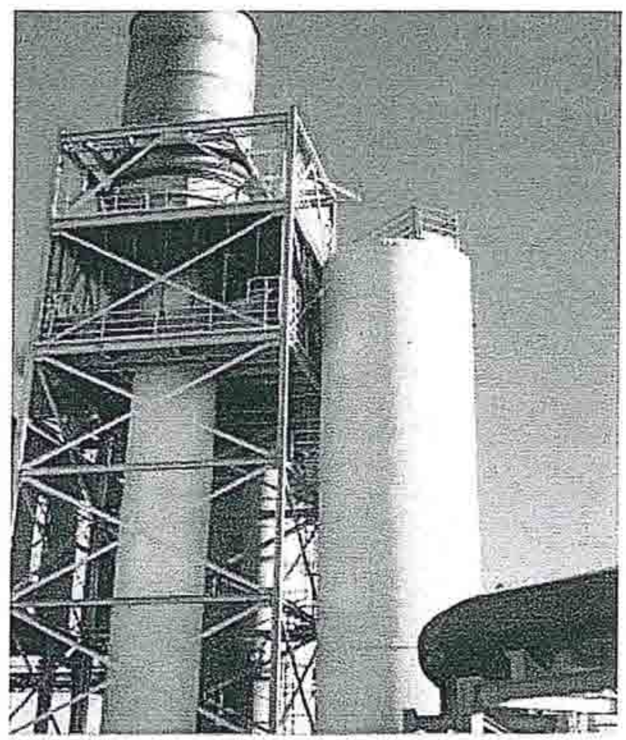
Odors from a composting operation can be a nuisance and a potential irritant. Offensive odors from composting sites are the primary source of public opposition to composting and have led to the closing of several otherwise well-operated composting facilities. Although research shows that biosolids odors may not pose a health threat, odors from processing facilities have decreased public support for biosolids recycling programs (Toffey, 1999). Many experts in the field of biosolids recycling believe that biosolids generating and processing facilities have an ethical responsibility to control odors and protect nearby residents from exposure to malodor.

Composting odors are caused by ammonia, amine, sulfur-based compounds, fatty acids, aromatics, and hydrocarbons (such as terpenes) from the wood products used as bulking agents (Walker, 1992). A properly designed composting plant, such as the one shown in Figure 4, operated at a high positive redox potential (highly aerobic) will reduce, but not necessarily eliminate, odors and odor causing compounds during the first 10 to 14 days of the process (Epstein, 1998). Control of odors is addressed in further detail in the fact sheet entitled Odor Management in Biosolids Management (EPA 832-F-00-067).

In addition to odors, other bioaerosols, such as pathogens, endotoxins, and various volatile organic compounds, must also be controlled. Biofilters are often used to control odors, but the biofilters themselves can give off bioaerosols.

Pathogens, such as bacteria, viruses, and parasites (helminth and protozoa), are present in untreated wastewater residuals. These organisms can potentially invade a normal, healthy human being and produce illness or debilitation. Composting reduces bacterial and viral pathogens to non-detectable levels if the temperature of the compost is maintained at greater than 55 C for 15 days or more. Additionally, it has been demonstrated that viruses and helminth ova do not regrow after thermal inactivation (Hay, 1996).

Regrowth of *Salmonella* sp. in composted biosolids is a concern, although research shows that salmonellae reach a quick peak during regrowth, then die off. Composting is not a sterilization process and a properly composted product maintains an active population of beneficial microorganisms that compete against the pathogenic members. Under some conditions, explosive regrowth of pathogenic microorganisms is possible. A stabilized product with strict control



Source: Parsons, 2002.

FIGURE 4 ODOR CONTROL EQUIPMENT CAN BE A SUBSTANTIAL PART OF CAPITAL INVESTMENT

of post-composting handling and addition of amendments coupled with four to six weeks of storage will mitigate *Salmonella* regrowth (Hay, 1996).

Compost workers may be exposed to a common fungus known as *Aspergillus fumigatus*, endotoxins, or other allergens. *A. fumigatus* is common in decaying organic matter and soil. Inhalation of its airborne spores causes skin rashes and burning eyes. While healthy individuals may not be affected, immunocompromised individuals may be at risk. The spores of *A. fumigatus* are ubiquitous and the low risk of exposure is not a significant health concern. However, spore counts at composting facilities are high, and the risk of operators and persons handling composted biosolids being exposed to these spores is also high (Epstein, 1998). Inhalation of spores, particulates, and other matter can be reduced or prevented by:

- Wearing masks and other protective devices.
- Equipping front end loaders with filters or air conditioners.
- Thoroughly ventilating composting halls.
- Installing biofilters or other odor scrubbing systems in composting halls (Epstein 1998).

Organic dust (such as pollen) is another nuisance that must be controlled at composting operations. These contaminants are primarily a concern to workers at the composting facilities and are generally not present in quantities that would cause reactions in most individuals that are not exposed outside of the facilities.

Environmental Impact

Potential environmental impacts may result from both composting operations and use of the compost product.

<u>Composting Process</u>

Dust and airborne particles from a composting operation may affect air quality. The impact to adjacent areas may need to be mitigated and permitted.

To protect area ecology and water quality, run-off from application sites must be controlled. The potential nitrogen and phosphorus rich run-off (or leachate) can cause algal growth in surface water and render groundwater unfit for human consumption.

<u>Land Application of Compost Products</u>

Excess nitrogen is detrimental to soil, plants, and water, so care must be taken when choosing application sites, selecting plant/crop types, and calculating the agronomic rate for biosolids land application. It should be noted that the most plant-available form of nitrogen in biosolids (ammonium ion (NH_4^+)) is converted to nitrate (NO_3^-) by the composting process. Improper use of biosolids can result in the contamination of water resources with leached nitrogen, because nitrate is more mobile than ammonium, and is taken up less easily by plants. However, applying compost in accordance with the Part 503 Regulations poses little risk to the environment or public health (Fermante, 1997). In fact, the use of compost can have a positive impact on the environment in addition to the soil improving characteristics previously discussed. Reduced dependence on inorganic fertilizers can significantly decrease nitrate contamination of ground and surface waters often associated with use of inorganic fertilizers.

PERFORMANCE

Composting is a viable, beneficial option in biosolids management. It is a proven method for pathogen reduction and results in a valuable product. According to a 1998 survey in *Biocycle, The Journal of Composting and Recycling*, 274 biosolids composting facilities were operating in the United States (Goldstein, 1999). Nearly 50 additional facilities were in various stages of planning, design, and construction. A large number of these facilities (over 40 percent) use the aerated static pile composting method.

Since 1984, EPA has encouraged the beneficial use of wastewater residuals through formal policy statements. The implementation of Part 503 enhanced the acceptance of biosolids as a resource by standardizing metal and pathogen concentrations. Moreover, Part 503 officially identifies composting as a method to control pathogens and reduce vector attraction.

Discussions of the specific performance factors of the three primary composting methods are provided below.

Aerated static pile systems are adaptable and flexible to bulking agents and production rates. Aerated static pile is mechanically simple, thus with lower maintenance than other cost method. Conversely, this configuration can be labor intensive and may produce nuisance odors and dust. Cover, negative aeration, chemically scrubbing, or use of a well-maintained biofilter may be required to minimize off-site odor migration. The popularity of the aerated static pile method is based on the ease of design and operation and lower capital costs associated with facility construction. Selection of an appropriate method requires an assessment of the physical facility, process considerations, and operation and maintenance costs (WEF, 1995).

Windrow composting is adaptable, flexible and relatively mechanically simple. However, the windrow configuration requires a large area and can result in release of malodor, dust, and other airborne particles to the environment during natural processing, ventilation, and windrow turning.

In-vessel systems are less adaptable and flexible compared with aerated static pile and windrow systems. However, in-vessel composting requires a smaller area. Because the reactor is completely enclosed, the potential for odor and the need for controls is increased. Due to the greater complexity of in-vessel mechanical systems, trouble can be encountered meeting peak flows, breakdowns are more frequent, and repairs are more difficult and costly. Failure of aeration devices, under- designed aeration systems, or lack of a back-up aeration method may cause large quantities of product to become anaerobic, and therefore, unacceptable. Often the compost residence time in in-vessel composting systems is inadequate to produce a stable product, particularly where the depth of the composting mass is great, (e.g., more than 3 m [10 feet]) and mixing does not occur. In addition, bridging sometimes occurs within these systems. Finally, depending upon the configuration and direction of air flow, the worker environment can be very hostile. However, in-vessel composting requires a smaller area and generates relatively little dust outside the facility.

Table 2 compares the three methods and highlights key features of each.

COSTS

The capital costs of aerated static pile or windrow configuration may be lower than in-vessel composting configurations, but costs increase markedly when cover is required to control odors. More highly mechanized in-vessel systems are often more costly to construct, but tend to be less labor intensive. On the other hand, in-vessel systems tend to be less flexible in their ability to adapt to changing properties of biosolids and bulking agent feedstocks.

Capital costs of in-vessel systems range from \$33,000 to \$83,000 per dry metric ton (\$30,000 to \$75,000 per dry ton) per day processing capacity. A typical aerated static pile facility costs approximately \$33,000 per dry metric ton (\$30,000 per dry ton) per day of processing capacity (Harkness, 1994; U.S. EPA, 1989).

Typical operation and maintenance (O&M) costs for in-vessel systems range from \$150 per dry ton per day to greater than \$200 per dry ton per day. Aerated static pile O&M costs average \$150 per dry ton per day (Harkness, 1994; U.S. EPA, 1989). Costs for windrow systems fall between the costs for in-vessel and aerated static pile. The selling price for compost ranges from \$5 to \$10 per cubic yard or \$10 to \$20 per ton. Some facilities allow landscapers and homeowners to pick up compost for little or no charge.

TABLE 2 COMPARISON OF COMPOSTING METHODS

Aerated Static Pile	Windrow	In-Vessel
Highly affected by weather (can be lessened by covering, but at increased cost)	Highly affected by weather (can be lessened by covering, but at increased cost)	Only slightly affected by weather
Extensive operating history both small and large scale	Proven technology on small scale	Relatively short operating history compared to other methods
Large volume of bulking agent required, leading to large volume of material to handle at each stage (including final distribution)	Large volume of bulking agent required, leading to large volume of material to handle at each stage (including final distribution)	High biosolids to bulking agent ratio so less volume of material to handle at each stage
Adaptable to changes in biosolids and bulking agent characteristics	Adaptable to changes in biosolids and bulking agent characteristics	Sensitive to changes in characteristics of biosolids and bulking agents
Wide-ranging capital cost	Low capital costs	High capital costs
Moderate labor requirements	Labor intensive	Not labor intensive
Large land area required	Large land area required	Small land area adequate
Large volumes of air to be treated for odor control	High potential for odor generation during turning; difficult to capture/contain air for treatment	Small volume of process air that is more easily captured for treatment
Moderately dependent on mechanical equipment	Minimally dependent on mechanical equipment	Highly dependent on mechanical equipment
Moderate energy requirement	Low energy requirements	Moderate energy requirement

Source: Parsons, 2002.

REFERENCES

Other Related Fact Sheets

In-Vessel Composting of Biosolids
EPA 832-F-00-061
September 2000

Odor Management in Biosolids Management
EPA 832-F-00-067
September 2000

Centrifuge Thickening and Dewatering
EPA 832-F-00-053
September 2000

Belt Filter Press
EPA 832-F-00-057
September 2000

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ADDITIONAL INFORMATION

Chuck Murray
Chief of Plant Operations
Washington Suburban Sanitation Commission
14501 Sweitzer Lane
Laurel, Maryland 20707

R. Tim Haug
Deputy City Engineer, Wastewater
Dept. of Public Works, Bureau of Engineering
650 South Spring Street, Suite 200
Los Angeles, California 90014-1911

United States Composting Council
200 Parkway Drive South, Suite 310
Hauppauge, New York 11788

John Walker, PhD
U.S. EPA
Mail Code 4204
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Office of Water
EPA 832-F-02-024
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For more information contact:

Municipal Technology Branch
U.S. EPA
Mail Code 4204M
1200 Pennsylvania Ave, NW
Washington, D.C. 20460

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United States Environmental Protection Agency
Office of Water Washington, D.C.
EPA 832-F-00-061 September 2000

EPA

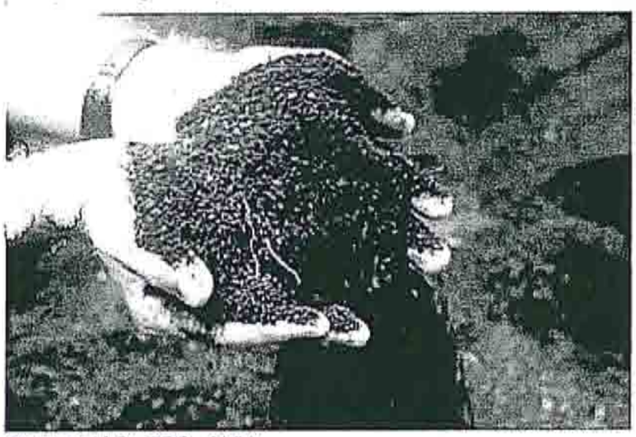
Biosolids Technology Fact Sheet

In-Vessel Composting of Biosolids

DESCRIPTION

Biosolids are primarily organic materials produced during wastewater treatment which may be put to beneficial use. Composting is the biological degradation of organic materials under controlled aerobic conditions. The process is used to stabilize wastewater solids prior to their use as a soil amendment or mulch in landscaping, horticulture, and agriculture. Figure 1 shows an example of a finished product of compost. Stabilization of wastewater solids prior to their use serves to destroy pathogens (disease causing organisms), minimize odors, and reduce vector attraction potential.

The Environmental Protection Agency's (EPA's) 40 CFR Part 503, *Standards for the Use and Disposal of Sewage Sludge*, (the Part 503 Rule) defines two types of biosolids with respect to pathogen reduction: Class A and Class B. The difference is defined by the degree of pathogen reduction on the solids. When federal performance standards are met, composting insures full destruction of pathogens to *non-detectable levels* in the wastewater solids (i.e., to Class A standards.) The Part 503 Rule requires the composting process to maintain a temperature of at least 55 degrees Celsius for a minimum of three days to effectively destroy pathogens and qualify as Class A.



Source: U.S. EPA, 1986.

FIGURE 1 FINISHED COMPOST PRODUCT

In addition to performance standards for the composting process, the Part 503 Rule established maximum concentrations for nine metals which cannot be exceeded in biosolids products, including compost. These are known as ceiling concentrations. The federal maximum allowable metals concentrations are provided in Table 1. The Part 503 Rule also established more stringent pollutant concentrations. Biosolids products which do not exceed pollutant concentrations, meet Class A pathogen reduction requirements, and are processed to reduce vector attraction potential are often referred to as *Exception Quality* products. Products meeting these requirements may be freely distributed for a variety of uses.

There are three general methods of composting biosolids: windrow, aerated static pile, and in-vessel. Each method uses the same scientific principals but varies in procedures and equipment needs. This Fact Sheet addresses in-vessel composting.

In-vessel composting occurs within a contained vessel, enabling the operator to maintain closer control over the process in comparison with other composting methods. A typical flow diagram for in-vessel composting is shown in Figure 2.

There are several types of in-vessel composting reactors: vertical plug-flow, horizontal plug-flow, and agitated bin. The primary difference involves

TABLE 1 MAXIMUM METAL CONCENTRATIONS

Metal	Ceiling Concentration (mg/kg)	Pollutant Concentrations (mg/kg)
Arsenic	75	41
Cadmium	85	39
Copper	4,300	1,500
Lead	840	300
Mercury	57	17
Molybdenum	75	NL
Nickel	420	420
Selenium	100	100
Zinc	7,500	2,800

NL = No established limit

Source: U.S. EPA, 1993 and 1994.

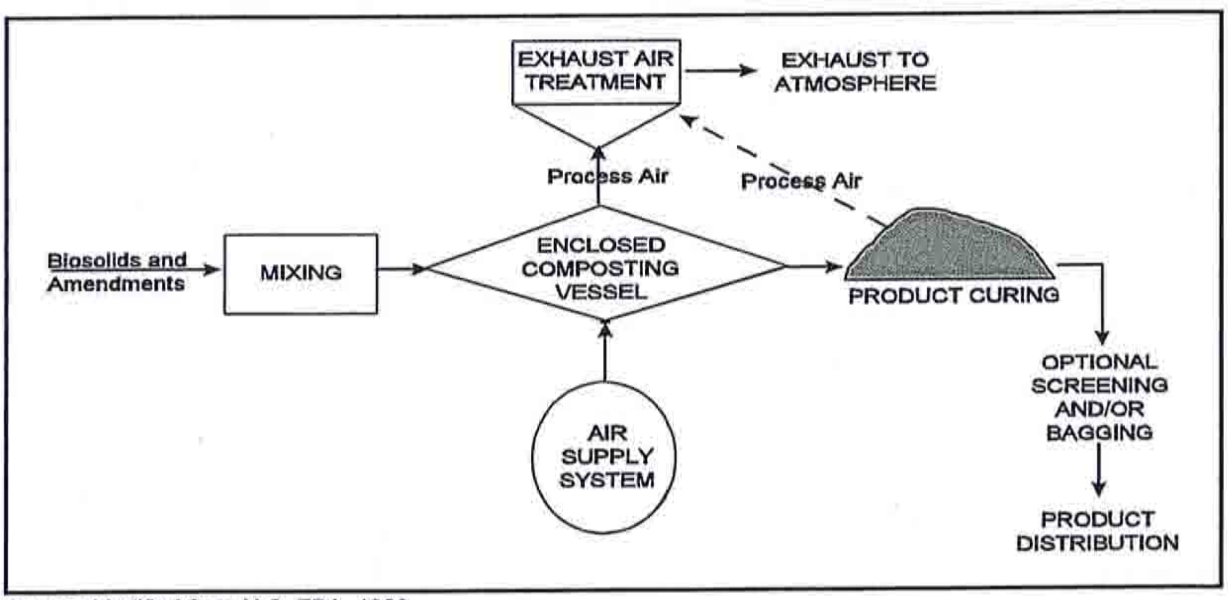
the aeration systems and loading/unloading provisions. The first two systems operate as plug-flow, which means that biosolids and bulking agent are loaded on a periodic basis (typically daily or weekly) while "finished" compost is discharged from the opposite end of the system on roughly the same schedule. The vessel is only completely emptied for maintenance.

In vertical plug-flow systems, the biosolids and bulking agent mixture is introduced into the top of the reactor vessel and compost is discharged out the bottom by a horizontally rotating screw auger. Air is introduced in these systems either from the bottom and travels up through the composting mass where it is collected for treatment or through lances hanging from the top of the reactor.

In horizontal plug-flow systems, the compost and bulking agent mixture is loaded into one end of the reactor. A steel ram pushes the mixture through the reactor. Air is introduced and exhausted through slots in the floor of the reactor. Compost is discharged from the end of the reactor opposite the ram.

The agitated bed reactors are typically open topped. The biosolids and bulking agent mixture is loaded from above. The composting mass is periodically agitated using a mechanical device and air is introduced through the floor of the reactors. Agitated bed reactors can be operated as either plug flow or batch operations. In batch operations, the vessel is loaded with biosolids and bulking agent, processing takes place, and the vessel is emptied.

As with other composting methods, the resulting product is generally cured for at least 30 days after



Source: Modified from U.S. EPA, 1989.

FIGURE 2 FLOW DIAGRAM OF A TYPICAL IN-VESSEL COMPOSTING FACILITY

Composting Basics

During composting, microorganisms break down organic matter in wastewater solids into carbon dioxide, water, heat, and compost. To ensure optimal conditions for microbial growth, carbon and nitrogen must be present in the proper balance in the mixture being composted. The ideal carbon-to-nitrogen ratio ranges from 25 to 35 parts carbon for each one part of nitrogen by weight. A lower ratio can result in ammonia odors. A higher ratio will not create optimal conditions for microbial growth causing degradation to occur at a slower rate and temperatures to remain below levels required for pathogen destruction. Wastewater solids are primarily a source of nitrogen and must be mixed with a higher carbon-containing material such as wood chips, saw dust, newspaper or hulls. In addition to supplying carbon to the composting process, the bulking agent serves to increase the porosity of the mixture. Porosity is important to ensure that adequate oxygen reaches the composting mass. Oxygen can be supplied to the composting mass through active means such as blowers and piping or through passive means such as turning to allow more air into the mass. The proper amount of air along with biosolids and bulking agent is important. Haug (1980) provides the basis for calculating the appropriate amounts of these materials.

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active composting and before use. A properly operated facility produces a stable compost which can be easily handled and safely stored. Compost enhances soil properties, such as water holding capacity, nutrient availability, and texture. In *Compost Engineering*, R.T. Haug (1980) discusses several ways to determine the degree of stability achieved during composting including:

- Oxygen uptake rate.
- Low degree of reheating in curing piles.
- Organic content of the compost.
- Presence of nitrates and the absence of ammonia and starch in the compost.

Because this process results in a usable material, an important and often overlooked part of any composting facility is product storage and marketing. Unlike disposal-oriented technologies, end users and markets for the product are seasonal with peak demand in the spring and fall. Therefore, provisions for storage of the final product until it is sold are necessary. In addition, product marketing efforts are essential to insure that end users understand the material, recognize its value, and are familiar with proper application techniques.

APPLICABILITY

The physical characteristics of most biosolids allow for their successful composting. However, many characteristics will impact design decisions. These characteristics are discussed in the Design Criteria section.

In-vessel technology is more suitable than other composting technologies in suburban and urban settings because the system allows for containment and treatment of air to remove odors before release. The requirement for a relatively small amount of land also increases its applicability in these settings over other types of composting. However, a market for use of the resulting product will generally be more readily available in suburban and rural areas rather than urban settings.

ADVANTAGES AND DISADVANTAGES

Advantages

Composting offers advantages and disadvantages that must be considered before selecting this option for managing biosolids. First, composting produces a reusable product as long as the feed materials are suitable. Use of the product returns valuable nutrients to the soil and enhances conditions for vegetative growth. Compost can be handled more easily than some other biosolids products such as digested biosolids. It is very friable and has the consistency of a peat soil. In addition, compost, unlike other Class A products, is not subject to end use restrictions. However, composting somewhat increases the amount of material to be managed through addition of bulking agent to improve aeration in the composting mass. Typically, one cubic yard of cake will produce three cubic yards of compost. Some bulking agents can be screened out and reused to minimize this disadvantage. This "disadvantage" may also be an advantage because the product can be sold.

In comparison with other types of composting, the in-vessel technology offers the following conveniences:

- The composting process can be more closely controlled.
- The effects of weather are diminished.
- Less bulking agent may be required.
- The quality of the resulting product is more consistent.
- Less manpower is required to operate the system and staff is less exposed to the composting material.
- Process air can be more easily collected for treatment to reduce odor emissions.
- Less land area is required.
- Public acceptance of the facility may be better.

Disadvantages

There are also disadvantages associated with in-vessel composting which must be considered before selecting this technology for wastewater solids management. In-vessel composting is generally more costly than other composting methods, particularly with respect to capital expenditures. In addition, because it is more mechanized, more equipment maintenance is necessary. A significant drawback of composting that must be addressed during facility design is the potential for fires. The large amount of carbonaceous material stored and used at composting facilities creates the potential for fires in storage areas as well as in the active composting mass. Sufficient aeration and moisture are necessary to avoid fires.

Environmental Impacts

Several aspects of an in-vessel composting facility can result in environmental impacts if the facility is mismanaged. Proper design and operation can reduce environmental impacts. Storage, distribution, and use of the resulting product can also result in environmental impacts if not performed properly.

In-vessel composting facilities can impact air, water, and soil. The primary impact to the air is nuisance odors if process air is not properly treated before emission to the atmosphere. Most in-vessel composting facilities treat process air with either a biofilter or chemical scrubbing system prior to release to the atmosphere. Odors can result from several possible constituents in the air exiting a composting vessel. Much work has been done in the last several years to characterize and control odors from composting operations. Bioaerosols (organisms or biological agents in air that affect human health) are also a concern in compost emissions. The most widely studied bioaerosol is *Aspergillus fumigatus,* a fungal spore. Endotoxins (non-living components of cell walls of gram-negative bacteria) and organic dust (such as pollens) are also bioaerosols. These contaminants are primarily of concern to workers at the composting facilities and are generally not present in quantities that would cause reactions in most humans. Health effects to compost facility workers have not been readily apparent in studies conducted to identify such effects (Epstein *et al.*, 1998.)

Impacts to surface water bodies resulting from in-vessel composting are unlikely. The enclosed nature of the technology greatly diminishes the potential for impacts to surface water due to high nitrogen concentrations in runoff. Buildings should be designed with floor drains to sewers or holding tanks. Any unenclosed portions of an in-vessel composting operation, such as materials receiving and mixing, product curing, and product storage should be designed with leachate/runoff containment and provisions for disposal or treatment to avoid runoff potential.

The use of biosolids compost as a soil conditioner results in the following:

- Increases water holding capacity.
- Increases aeration and drainage for clay soils.

- Provides organic nitrogen, phosphorus, and potassium.
- Provides essential plant micronutrients.
- Can reduce the need for pesticides.

Other environmental benefits of producing and using compost include the recycling of a valuable resource, reduction of dependence on chemical fertilizers, and offsetting the use of natural resources such as trees or peat moss as mulch material.

DESIGN CRITERIA

The following biosolids characteristics must be considered in designing an in-vessel composting system:

- Moisture content.
- Volatile solids content.
- Carbon content.
- Nitrogen content.
- Bulk density.

These factors are discussed in detail in *Composting Engineering* (Haug, 1980.)

The following bulking agent characteristics must also be considered:

- Size.
- Cost/availability.
- Recoverability.
- Carbon availability.
- Preprocessing requirements.
- Porosity.
- Moisture content.

Metals content of the biosolids will affect the usability of the final product and must be considered during design to ensure a market for the final product.

An odor control system is an inherent part of in-vessel design. The cost of an odor control system can account for up to 50 percent of both capital and operation and maintenance costs. Composting facilities usually use either wet scrubbers or biofilters for odor control. The level of odor control required is a function of the quality and quantity of air to be treated, the results of air dispersion modeling, and proximity to occupied dwellings.

The most important design feature of a composting system is the ability to maintain uniform aerobic conditions during composting. The air distribution system may be controlled by cycle timers and/or temperature feedback control. The design must avoid compaction of the composting mass to maintain sufficient pore space for aeration. In addition, provisions for routine monitoring of temperatures must be included.

Equipment should be designed to provide maintenance staff with safe access. Equipment and instrumentation should be able to be removed or repaired without having to relocate composting material.

Systems that minimize worker exposure to hot exhaust process gases are preferable because workers can maintain the system and control odors with greater ease, including minimizing the volume of process air that must be treated.

Many in-vessel systems include a water spray system to add moisture to the composting mass, to control temperatures, and for fire protection.

Detention times, which vary with system configuration, will affect many design considerations, including equipment sizing. Horizontal agitated bed systems are designed for 21 days of aerated composting followed by curing. Other in-vessel systems use 10 to 21 days of active composting. Some state regulations dictate detention times for composting systems. In general, about 21 days is a good minimum time for adequate stabilization. Provisions to monitor the degree of stabilization allow operators to determine when the biosolids are adequately processed and ready for removal to curing piles.

Features of the site on which the in-vessel composting facility is to be located must be considered during design, including size, relative position to residential areas, availability of wastewater treatment, drainage, and access. Examples of optimum locations for in-vessel composting include a large tract of land in an industrial area or a site near a municipal solid waste landfill. One needs to determine the meteorology of a potential site so that odors can be adequately treated, diluted and dispersed.

PERFORMANCE

According to a survey conducted by *BioCycle, Journal of Composting and Recycling,* in January 1999, there were 54 in-vessel composting facilities processing wastewater residuals across the United States (Goldstein and Gray, 1999) and 11 more facilities were in various stages of design or construction. Since that survey, at least two facilities (Portland, Oregon and Camden County, New Jersey) have closed. The vendor systems used at the facilities listed in this survey include:

- Davis Composting and Residuals Management (formerly Taulman Composting Systems.)
- Bedminster Bioconversion (co-composting with municipal solid waste.)
- US Filter/International Process Systems.
- Longwood Manufacturing.
- American Biotech Systems.
- Purac.
- Gicon Tunnels.
- Resource Optimization Technology (ROT Box.)
- Compost System Company Paygro.
- Green Mountain Technologies.
- Waste Solutions.
- Royer.
- Fairfield.
- Conporec.
- Compost System Company Dynatherm.
- Dano.

In addition to these, there are several aerated static pile systems contained within a building that are categorized as in-vessel systems.

The above list is not intended to be a comprehensive list of vendors who offer in-vessel composting facilities. There are also many facilities in operation which use non-patented systems and components.

The number of operating in-vessel composting facilities for biosolids in the United States has steadily increased in the last two decades but has leveled off in recent years. In spite of early operational difficulties and challenges, many early facilities have been upgraded and are successfully operating today.

OPERATION AND MAINTENANCE

In-vessel composting systems can be relatively complex but the skills required for successful operation are common to wastewater treatment plant personnel. Typical labor requirements include heavy equipment operators, maintenance personnel, and instrumentation/computer operators. A clear understanding of biological systems is necessary. Additional staff or consultants are needed to manage end use and to market the compost.

In-vessel composting facilities can require significant maintenance. Many early composting facilities constructed in the United States experienced a variety of operating problems. Odor complaints from neighboring residents have caused facilities to operate at reduced capacity or to shut down for extended periods of time for system modification. For example, a horizontal plug-flow system in Hickory, North Carolina, was shut down for more than a year while an odor issue was addressed. The system reopened after the addition of air pollution control equipment. The lack of available spare parts has also caused extensive periods of downtime at some facilities. Design configurations have caused some facilities, primarily vertically oriented plug-flow systems, to experience month-long periods of inoperation while routine maintenance was performed. Difficulties in emptying the vessels have been cited as a reason for significant maintenance requirements (O'Brien, 1986.) A system in Lancaster, Pennsylvania, was shut down when state regulators determined it did not meet temperature requirements for Class A pathogen reduction.

There are three basic compost market strategies. The first is the use of compost areas used by the public sector, such as parks, ball fields, landfill cover, and urban reclamation projects. Second, direct marketing to users maximizes revenue and improves the public image of the producer. This strategy could include distribution centers run by the compost facility where customers, such as homeowners, greenhouses, landscapers, and nurseries, can come to pick up the compost. The third strategy is to use a compost broker. This may result in lower revenue but removes the administrative burden of compost marketing. About 25 percent of composters employ a broker. It should be noted that revenue from compost sales will not cover production costs but should offset market development costs. Sale prices range from $5 to $60 per ton.

COSTS

Costs associated with in-vessel composting systems vary considerably from facility to facility. Site specific factors and the many configurations and equipment choices make it difficult to provide general costs for this technology. Annual operation and maintenance costs as low as $61 and as high as $534 per dry ton of biosolids composted were cited in a 1989 survey (Alpert *et. al.*, 1989.) A more recent assessment estimated costs for composting between $100 and $280 per dry ton of biosolids processed. In-vessel systems generally represent the high end of such cost ranges (O'Dette, 1996.)

The following items must be considered when estimate costs for a specific in-vessel composting facility:

- Land acquisition.
- Equipment procurement, including the composting vessel, loading equipment, conveyors, air supply equipment, temperature monitoring equipment, and odor control equipment.
- Operation and maintenance labor.
- Additives, such as bulking agents, to be used in the specific vessel selected.
- Energy (electricity and fuel for equipment).
- Water and wastewater treatment.
- Equipment maintenance and upkeep.
- Product distribution expenses and marketing revenues.
- Regulatory compliance expenses such as permitting, product analysis, process monitoring, record keeping and reporting.
- Preprocessing equipment for bulking agent.

REFERENCES

Other Related Fact Sheets

Odor Management in Biosolids Management
EPA 832-F-00-067
September 2000

Centrifugal Dewatering/Thickening
EPA 832-F-00-053
September 2000

Belt Filter Press
EPA 832-F-00-057
September 2000

Other EPA Fact Sheets can be found at the following web address:
http://www.epa.gov/owmitnet/mtbfact.htm.

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ADDITIONAL INFORMATION

City of Davenport
Scott Plett
P.O. Box 2707
Davenport, Iowa 52808

E&A Environmental Consultants
Eliot Epstein
95 Washington Street; Suite 218
Canton, Massachusetts 02071

NC Division of Pollution Prevention
Craig Coker
1639 Mail Service Center
Raleigh, North Carolina 27699-1639

For more information contact:

Municipal Technology Branch
U.S. EPA
Mail Code 4204
1200 Pennsylvania Ave, N.W.
Washington, D.C. 20460

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To: Mark Earnest, Brian Lemke, Scott Bradford – Haines Borough

From: J. Ryan Moyers, P.E., John Koch, P.E. - HDR

Date: January 5, 2012

Memorandum

Subject: Haines Wastewater Treatment Plant – Sewage Screenings Handling

Introduction

The Haines Wastewater Treatment Plant currently uses wedge wire rotary drum screens (manufactured by Hycor) to separate the grit and solid materials from the raw influent flow. The drum screens generally retain small rags, paper, plastic materials, grit, undecomposed food waste, fecal matter, etc. Because the screenings contain fecal matter (as well as grease and scum), proper handling and disposal of the material is important. Currently, screenings from the Hycor units are discharged directly into a collection hopper and stored on-site. As the photos below (taken on recent site visits) illustrate, the screenings/grit at the Haines WWTP are wet and contain visible organic and fecal material.

Figure 1 – Existing Screenings Process

Handling and disposal of the screenings can be a time-consuming and costly operation. The screenings at the Haines plant cannot be composted with the sludge and are currently being stored in a large crate at the site. The location for ultimate disposal of the screenings is undetermined at this point and a cause for concern as screenings continue to accumulate at the plant. As the Borough determines a disposal site, one alternative that could offer some benefits in terms of reducing the volume of screenings at the plant is a screenings washer/compactor. These devices can be used to wash, dewater, and compact screenings to significantly reduce the weight and volume of the screenings. The current screenings at the plant are heavy and wet and contain visible fecal matter. The washer/compactors can offer volume and weight reduction of the screenings by up to 75% and reduction of fecal matter by greater than 95% and can offer a cleaner, more efficient screenings handling operation. The photo below is taken from an installation at another facility, and illustrates the use of a washer/compactor where the reduced solids are discharged into a bag and hopper for a relatively clean and efficient disposal.

Figure 2 – Washer/compactor Installation

Fact Sheets for three different washer/compactor manufacturers are enclosed with this memorandum. The Fact Sheets provide a description of the potential equipment that may be available to the Borough and some of the benefits associated with each unit. Detailed information including equipment sizing, layout drawings, capital and O&M costs, etc. have not been included in the fact sheets but could be provided if the Borough would like to move forward with the design of a washer/compactor unit.

1. FSM Washer/Compactors

Manufacturer	FSM – Waste Tech a Division of Kusters Zima
Type	Screenings Washer Press
Description	FSM Screenings Washer Press – SP(W)200x700 Washer/Compactors: • Reduces weight and volume of screenings while washing out as much as 95% of fecal matter • 304 Stainless Steel • 8” diameter screw auger with torque tube and nylon brushes fitted to screw flights to clean drainage trough perforations – Hardox 400. • 6mm perforated curved drainage section. • Drive system to include 2 HP, 1680 rpm, TEFC, geardrive motor suitable for use in Class 1, Div. 2 environment and 460 Vac/3 PH/ 60 Hz electrical supply, direct coupled to hi-strength alloy steel drive shaft. Controls: • Main Control Panel – NEMA 4X 304 Stainless Steel panel including transformer, PLC, VFD, relays, timers, operators, and all control devices for proper operation. • Local control station – NEMA 7 with H-O-A Switch and mushroom head E-Stop push button.

Evaluation Criteria/ Options	Comments
Options	

Evaluation Criteria/ Options	Comments
Install new washer/compactor	Current screenings/grit are wet and contain visible organic and fecal material.
Process Flexibility	
Benefits	Complete System: • Fecal matter reduction: Greater than 95% • Volume reduction: 60-70% • Weight reduction: 60-70% Washer/Compactor: • High reliability • Integral washing system
Throughput and flow capacity	Throughput up to 450 ft^3/hr. New washer/compactors should be designed to meet projected future peak hour flows; so, on average, an individual washer/compactor would be able to handle the average flowrates seen at the wastewater treatment plant.
Operation and Maintenance Impact	
Footprint/Installation	Proposed washer/compactors should fit in existing space at plant.
Controls	• Main control panel, NEMA 4X 304SS including transformer, PLC, VFD, relays, timers, operators, and all control devices. • Local control stations, NEMA 7 with H-O-A switch and mushroom head E-stop push button.
Lead Time	4-6 weeks from receipt of order. 12-14 weeks from receipt of signed approvals.

2. Huber RotaMat Wash and Press WAP	
Manufacturer	Huber Technology
Type	Huber RotaMat Wash and Press WAP
Description	The washer compactor to treat discharge directly from screening. A stainless steel conveying and compacting screw transports screenings in the wash zone. There they are exposed to turbulence created by automatic introduction of wash water. The turbulence achieves excellent removal of organics. The washing intensity and cycles are individually adjustable. The washed screenings are further conveyed to the press zone where they are pressed and dewatered by the compacting screw to a DS content of up to 45%. The washed and compacted screenings are finally pushed through the conical discharge pipe into a container. Compatible with Huber Screening options.

Evaluation Criteria/ Options	Comments
Options	
Install new washer/compactor	Current screenings/grit are wet and contain visible organic and fecal material.

Process Flexibility	
Benefits	• Dewatering performance of up to 45% DR • Volume, weight and disposal cost reduction of up to 75% • Screening throughput capacity of up to 420 cubic feet per hour • Completely made of stainless steel • Acid treated in pickling back for corrosion protection • Return of carbon-rich filtrate to wastewater • Unaffected by coarse materials • Screened wastewater or process water can be used as wash water • Flexible feed through lengths
Throughput and flow capacity	New washer/compactors should be designed to meet projected future peak hour flows; so, on average, an individual washer/compactor would be able to handle the average flowrates seen at the wastewater treatment plant.
Operation and Maintenance Impact	
Impact	Significant reduction in waste weight and disposal.
Footprint	Proposed washer/compactors should fit in existing space at plant.
Lead Time	16 weeks after approved submittal receipt.

3. Vulcan EWP Washing Press

Manufacturer	Vulcan Industries, Inc.
Type	Model EWP Washing Press
Description	The Model EWP Washing Press is a spiral press used to wash organic matter out of screenings material. The Washing Press washes, dewaters, compresses and transports screenings to the receiving device. The Washing Press receives the screenings from a primary screening device or conveyor through an inlet hopper. The spiral transports the screenings from the inlet to the washing zone where they are compacted and washed. In the washing zone, washwater is injected into the screenings from the openings in the hollow shaft of the spiral, and from a nozzle at the top of the unit. The Washing Press consists of a press body with separate washing and dewatering sections, hollow shaft spiral, axial thrust bearing, gear reducer and motor, drain pan, washwater headers and sequencing valves. The spiral is welded to the hollow shaft. The hollow shaft contains perforations located in the washing zone to introduce washwater to the screenings from the inside out. A nylon brush is attached to the trailing edge of the spiral to ensure debris is thoroughly removed from the drainage area. The drain pan is located directly under the press body and is easily removed for service.

Evaluation Criteria/ Options	Comments

Options	
Install new washer/compactor	Current screenings/grit are wet and contain visible organic and fecal material.
Process Flexibility	
Benefits	• Organic removal up to 90% • Screenings volume reduced by up to 85% • Volume, weight and disposal cost reduction of up to 75% • Stainless steel construction • Wedge wire drain with clog-free drainage of washwater • Flushing nozzle periodically rinses the drain pan
Throughput and flow capacity	New washer/compactors should be designed to meet projected future peak hour flows; so, on average, an individual washer/compactor would be able to handle the average flowrates seen at the wastewater treatment plant.
Operation and Maintenance Impact	
Impact	Significant reduction in waste weight and disposal.
Footprint	Proposed washer/compactors should fit in existing space at plant.